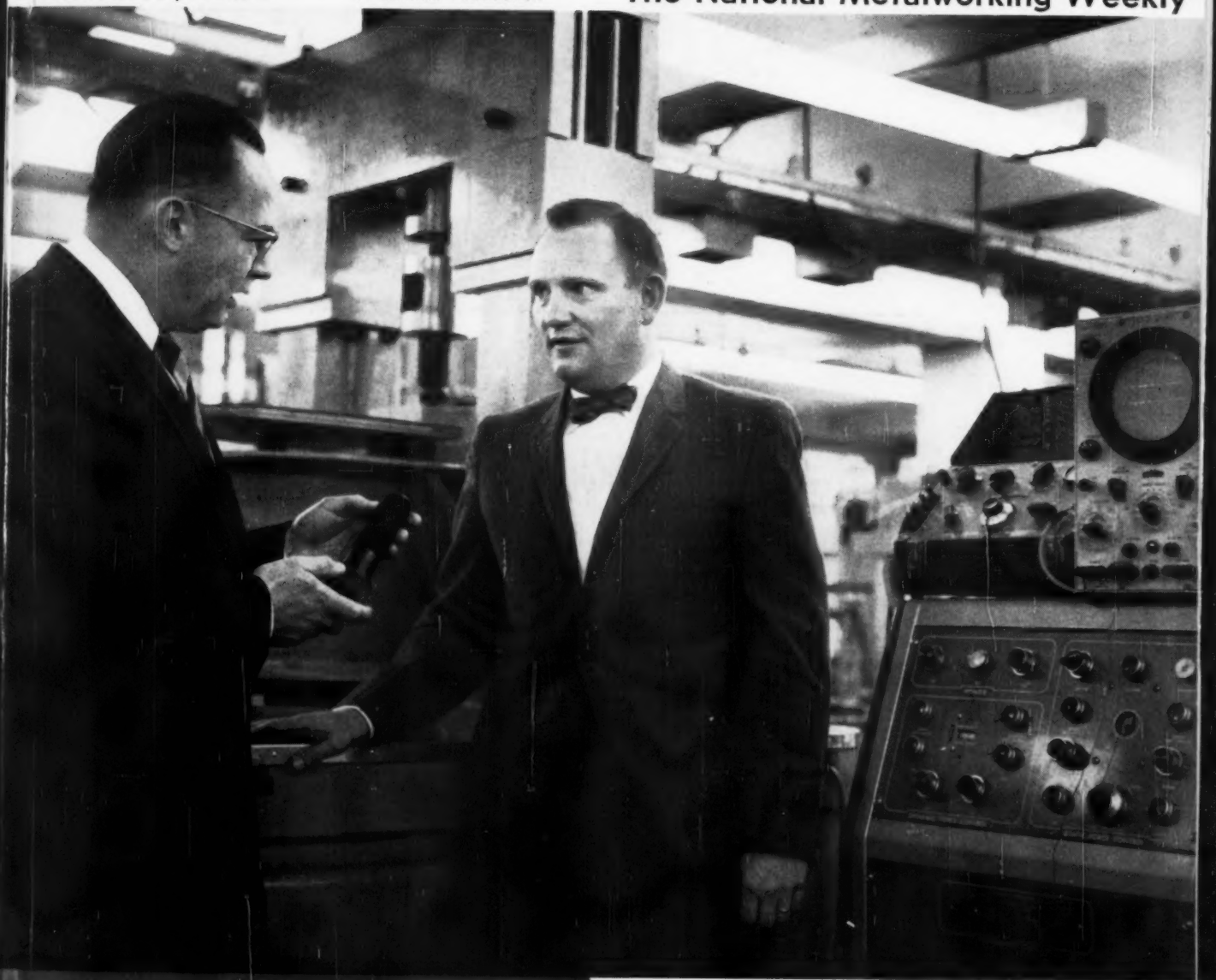
The IRON AGE

March 19, 1959 A Chilton Publication The National Metalworking Weekly



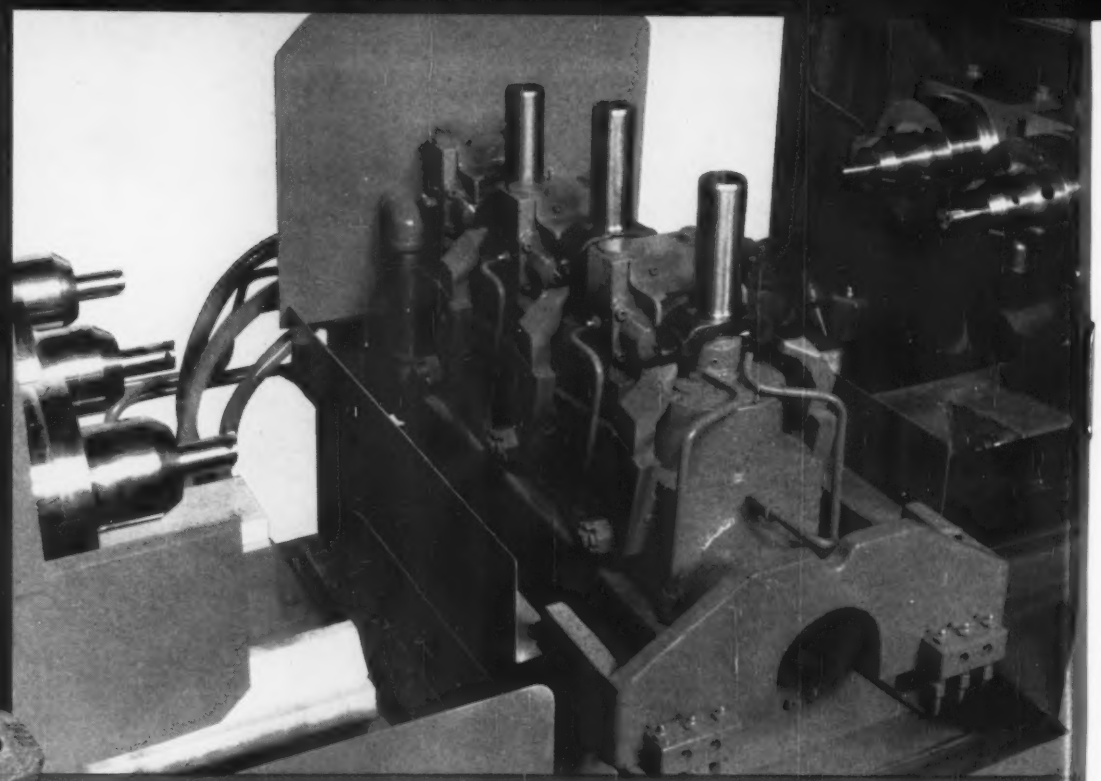
In Tonnage and Technology—

Fasteners Move With a Changing Demand P. 77

What Are Chances For Labor Reform Law? – P. 82

Link Steel's Fatigue To Retained Austenite – P. 115

Digest of the Week – P. 2-3



RIGHT: Vertical splined arbors and clamps holding shoulders of bores are operated hydraulically.

BELOW: Universal yoke showing two holes bored simultaneously.

Two-Way Boring Speeds Parts Production

58-9

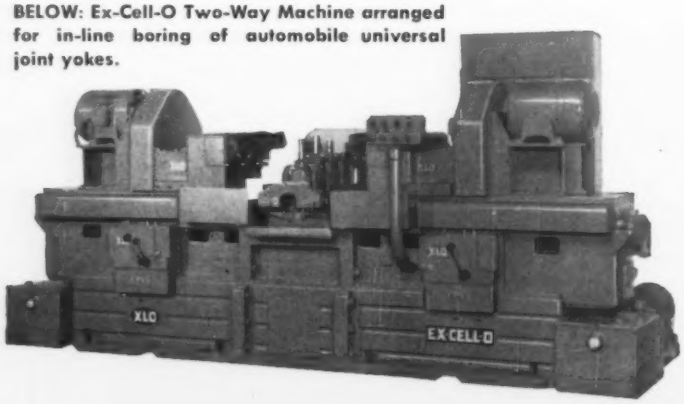
This Ex-Cell-O Precision Two-Way Boring Machine cuts production time of universal yokes for a manufacturer of automotive components by performing operations at both ends of a part—simultaneously.

Two independent machines interlocked electrically for central push-button control, the two-way unit bores two holes in line through malleable iron yokes held in a three station fixture. Both machine sections have three spindles on each slide for high production.

Two, three or four standard, self-contained way units can be easily arranged around a fixture at any angle the work requires. And like all Ex-Cell-O Precision Boring Machines, Way Machines are readily adaptable to different size workpieces—light, medium or heavy parts—and varying material requirements.

For complete information on versatile Ex-Cell-O Way Machines that can save time in your operation, contact your local Ex-Cell-O Representative, or write direct.

BELOW: Ex-Cell-O Two-Way Machine arranged for in-line boring of automobile universal joint yokes.



XLO EX-CELL-O FOR PRECISION

EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN

Machinery Division

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING AND BORING SPINDLES • CUTTING TOOLS • TORQUE ACTUATORS RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

IF ALL THE DELIVERY TRUCKS

OF ALL THE STEEL SERVICE CENTERS

WERE PLACED END TO END,

TRAFFIC WOULD BE TIED UP FOR MONTHS!

BUT, FORTUNATELY, THEY'RE NOT END TO END ...

THEY'RE BUSY THROUGHOUT THE COUNTRY

DELIVERING STEEL FAST.

SPEEDY DELIVERY IS JUST ONE OF THE MANY SERVICES

OF YOUR LOCAL STEEL SERVICE CENTER!

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Bethlehem Pacific Coast Steel Corporation,
San Francisco

BETHLEHEM STEEL

THE IRON AGE
Chestnut and 56th Sts.
Philadelphia 39, Pa., SH 8-2000
GEORGE T. HOOK, Publisher
EDITORIAL STAFF
TOM C. CAMPBELL, Editor-in-Chief
GEORGE F. SULLIVAN, Editor
Managing Editor E. C. Beaudet
News-Markets Editor J. B. Delaney
Technical Editor J. J. Obrzut
Special Features R. D. Raddant
Machinery Editor E. J. Egan, Jr.
Metallurgical Editor P. M. Unterweiser
Engineering Editor R. H. Eshelman
Art Director T. S. Paaby
Associate Editors: F. J. Starin, P. J. Cathey, R. Schulin, F.T.P. Plimpton, Jr.
Assistant Editor: J. A. Moore. Regional Editors: K. W. Bennett, Chicago; T. M. Rohan, Cleveland; H. R. Neal, Detroit; G. G. Carr, New York; R. R. Kay, Los Angeles; G. J. McManus, Pittsburgh; G. H. Baker, R. M. Stroupe, N. R. Regeimbal, Washington. Correspondents: F. L. Allen, Birmingham; N. Levenson, Boston; R. E. Koebbe, St. Louis; J. Miller, San Francisco; R. Kazarian, Buffalo; D. R. Coughlin, Seattle; A. T. Collins, Houston; F. Sanderson, Toronto; F. H. Harley, London, England. Chilton Editorial Board: Paul Wooton, Washington representative.

WASHINGTON EDITORIAL OFFICE
Washington 4 ..... National Press Bldg.
Robt. Gunning—Readability Consultant

BUSINESS STAFF
Production Manager Warren Owens
Director of Research Oliver Johnson
Marketing Director R. H. Groves
Circulation Mgr. W. M. Coffey
Promotion Manager Richard Gibson
Asst. Research Dir. Wm. Laimbeer

REGIONAL BUSINESS MANAGERS
*Denotes editorial office also
Atlanta 9 ..... J. W. Sangston
32 Peachtree St., NE Jackson 3-6791
*Chicago 1 .. T. H. Barry, W. R. Pankow
360 N. Michigan Ave. Randolph 6-2166
*Cleveland 15, R.W.Watts, R. L. White
930 B. F. Keith Bldg. Superior 1-2860
Columbus 15, Ohio ... Harry G. Mumm
LeVeque-Lincoln Tower Capital 1-3764
Dallas 6 ..... W. J. Smyth
189 Meadows Bldg. EMerson 8-4751
*Detroit 2 ..... W. J. Mulder
103 Pallister Ave. Trinity 1-3120
*Los Angeles 28 ..... R. Raymond Kay
2420 Cheremoya Ave. Holly'd 3-1882
*New York 17 ... C. T. Post, I. E. Hand
100 E. 42nd St. Oxford 7-3400
*Philadelphia 39—
B. L. Herman, J. A. Crites, W. E. Carr
Chestnut & 56th Sts. Sherwood 8-2000
*Pittsburgh 22 ..... T. M. Fallon
502 Park Bldg. Atlantic 1-1830
San Francisco 3 ..... Don May
1355 Market St. UNderhill 1-9737
W. Hartford 7 ..... Paul Bachman
62 LaSalle Rd. Adams 2-0486
England ..... Harry Becker
15 Gratton St., Altrincham, Cheshire

A Chilton Publication

CHILTON OFFICERS & DIRECTORS
Joseph S. Hildreth, Ch. of the Board
G. C. Buzby, President
Vice-Presidents: P. M. Fahrendorf, L. V. Rowlands, G. T. Hook, R. E. McKenna; Treasurer, W. H. Vallar; Directors: M. E. Cox, F. P. Tighe, E. B. Terhune, Jr., R. W. Case, Jr., J. C. Hildreth, Jr., C. A. S. Heinle, J. H. Kofron—Comptroller, Stanley Appleby.

Indexed in Applied Science & Technology Index and Engineering Index.

Copyright 1959 by Chilton Company

THE IRON AGE, published every Thursday by CHILTON COMPANY, Chestnut & 56th Sts., Philadelphia 39, Pa. Second class postage paid at Philadelphia, Pa. Price to the metalworking industries only or to people actively engaged therein, $5 for 1 year, $8 for 2 years in the United States, its territories and Canada. All others $15 for 1 year; other Western Hemisphere countries, $25; other Foreign Countries, $35 per year. Single Copies 50¢. Annual Review Issue $2.00. Cable: "Ironage," Philadelphia.

The IRON AGE

March 19, 1959—Vol. 183, No. 12

Digest of the Week in M

★Starred items are digested at right.

EDITORIAL

Steel Company Profits: Whose Business Are They? 7

NEWS OF INDUSTRY

★**Special Report:** Fasteners Meet Challenge of New Industry Demands 77
★Why Foundry Sales Are Up 80
★Builders Top Steel Users in '58 81
★Labor Reform Faces Tough Going 82
★Market for Locomotives Revives 84
★Turbine Imports Hit 85
The IRON AGE Salutes 89
Men in Metalworking 105

FEATURE ARTICLES

★Strength Loss Linked to Austenite 115
Controls Aid Refractory Output 119
★Shot Blast Cleans Ingot Molds 120
★Design Small Parts for Enameling 122
Isotopes Inspect Huge Castings 125
★Tungsten Is Forged and Extruded 126
Make Your Portable Tools Pay 128

NEW ANALYSIS

Newsfront 9
Report to Management 91
★Automotive 93
Washington 97
★West Coast 99
★Machine Tools 101

MARKETS & PRICES

Market Planning Digest 75
★**The IRON AGE Summary** 151
★Purchasing 152
Steel Product Markets 154
Index to Prices 155
Iron and Steel Scrap Markets 158
Nonferrous Markets 160
Clearing House 170

REGULAR DEPARTMENTS

Letters 11
Fatigue Cracks 13
Patent Review 132
New Materials, Components 140
New Equipment 146

INDEX TO ADVERTISERS 175

NEWS ARTICLES

LABOR REFORM LAW

Will One Be Passed?—Chances are slim that a tough labor law will be enacted this year. But labor

won't have things all its own way. Unions may have to make some unexpected concessions. P. 82

LOCOMOTIVE SALES

Head for a Revival—The lean years for the locomotive builders seem just about over. They are confident of a rising replacement market in the U. S., coupled with expanding sales overseas. P. 84

SMALL CARS

Big 3 Tooling Up—Detroit is no longer able to keep the lid closed on its new, small car plans. A lot of the tool work has already been completed. Some steel is being placed on order. Chevrolet should be first out next fall. P. 93

TITANIUM CARBIDES

New Cutters Wear Well—In cutting contests, titanium carbides have topped some ceramics and

Metalworking

INDUSTRIAL FASTENERS: Typical of the changing fastener industry is the elaborate testing equipment at Standard Pressed Steel Co. James V. Lester, vice president, and Robert L. Sproat, chief metallurgist, check test results. P. 77

tungsten carbides. But cost factors haven't been determined by Ford Motor Co., which developed them. P. 101

SCALE MAINTENANCE

Pays Off for User — Weighing authorities advise scale owners to install them properly, test them frequently, and teach personnel how to use them correctly. P. 152

FEATURE ARTICLES

STEEL FATIGUE STRENGTH

Key Loss to Austenite—Some of our strongest steels fail in fatigue. It's especially a problem in critical applications. An eye-opening report sheds new light on what has been suspected all along—retained austenite can actually promote fatigue failure at high stress levels. P. 115

CLEAN STEEL INGOT MOLDS

With Shot Blast—A specially designed machine cleans up to 56 steel ingot molds per shift. It eliminates the drudgery of manual cleaning and insures a high standard of cleanliness. The unit is housed in a large steel cabinet. A lance assembly descends into the mold for blasting. P. 120

DESIGNING SMALL PARTS

For Porcelain Enamel — Probably the greatest advantage of porcelain enamel is its durability under almost every type of condition. It pays to keep in mind a few design tips to get the best results in specifying porcelain finishes. P. 122

NEW FEATURE

Patent Review—Now you can get a fast rundown on important new patents in the metals field from your IRON AGE. This new feature appears in the third issue of each month. Latest list is on P. 132.

FORMING TUNGSTEN

Into New Shapes—Tungsten has bowed to a fabrication breakthrough. It can now be extruded, spun, forged, and even deep drawn. Tools are critical. Tungsten carbide is used because of its extreme hardness at high temperatures. P. 126

MARKETS & PRICES

STEEL FOUNDRY SALES

Heading Upward—Steel founders gathered for their annual meeting were confident. Reason: Order books are filling up at the fastest pace since 1957. And there's every reason for continued gains. P. 80

STEEL SHIPMENTS IN '58

Declines for Most Users—Total steel shipments last year were 59.9 million tons, almost 20 million tons less than in 1957. However, a few steel consuming industries held or increased their share. P. 81

ELECTRICAL EQUIPMENT

Anguish Over Imports—Domestic producers are up-in-arms over purchases of heavy power apparatus by federal agencies. Petitions of protest are filed with OCDM. P. 85

SPACE AGE PRODUCTS

Growing Market — Outer space equipment will be a multi-billion dollar market in ten years, says top Air Force missileman. And rewards will go to those who get ready for them, he adds. P. 99

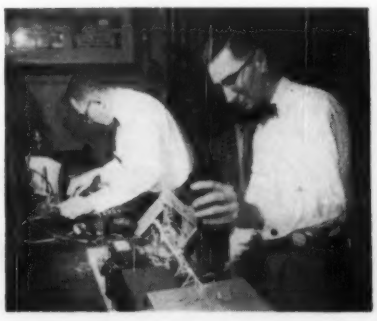
WHITHER STEEL LABOR?

It's Worrisome to Mills—If there's a long steel strike, the market will be tight when it's over. If there's no strike, the steel market may fall flat on its face. P. 151

NEXT WEEK

WELDING PROGRESS

Four Tougher Jobs—Next week's Special Welding Show Issue will cover welding progress from power supplies to electron beam welding. Tape-control also figures in solving many difficult welding assembly problems.



YOU CAN CUT INVENTORY INVESTMENT OF MECHANICAL TUBING

If you depend on B&W and your local Steel Service Center . . . because:

. your local Steel Service Center maintains large and diversified mechanical tubing stocks, available to you for immediate delivery

. . . your local Steel Service Center can help you cut handling and storage costs and maintain production continuity

And when it comes to mechanical tubing, ask for B&W Job-Matched Tubing. For information on how this tubing can reduce your production costs call the local B&W District Sales Office or write for Bulletin TB-352. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pennsylvania.

AMERICAN STEEL WAREHOUSE ASS'N

B&W

THE BABCOCK & WILCOX COMPANY

TUBULAR PRODUCTS DIVISION

TA-9000-SM1

Seamless and welded tubular products, solid extrusions, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels and special metals

B.F.Goodrich

SUCCESS STORIES

B.F.Goodrich distributors helped these customers cut costs. Can they help you?

Filling station for fire water

(See photo) In Rhode Island, a manufacturer of dyes and finishes for fine fabrics, uses strong sulphuric acid by the tankload. It's pumped from truck to storage tank through hose. But the acid is so strong and corrosive, it would eat its way through regular rubber hose. Metal tubing couldn't take the sharp angles or stand much bending.

When a B.F.Goodrich distributor heard of the problem, he recommended a new hose, specially developed by B.F.Goodrich for acid-handling service. The lining of this hose is made with a special compound, called "Hypalon," which stands those strong acids and chemicals that destroy ordinary rubber.

The B.F.Goodrich acid hose shown above has already lasted a year and a half, is still in excellent condition. It has put an end to the waste and danger of acid leaks, the cost of frequent hose replacements. It's lighter, easier to handle than the hose used previously; faster to hook up because of special attachments at the hose ends.

Ground trip

A brick manufacturer in Virginia uses a B.F.Goodrich Highseal conveyor belt to carry rejected raw bricks back to a pug mill to be ground up for re-use. An oil-resisting belt was needed because a certain amount of oil is added to the clay. At first, the distributor questioned the use of Highseal because it was regarded as a lightweight belt for food handling only, but after a year passed, he reported it had outlasted the previous belt. Now after nearly four years of six-day-a-week service, the B.F.Goodrich belt is still in use and shows very little wear.

Rundown feeling

In Illinois, rubber suction hose, reinforced with wire, was being used to drain big pools of water that accumulate in an underground coal mine. But after being run over several times by heavy mining equipment, the hose was crushed flat, had to be replaced.

In 1953, the company switched to a different kind of water suction hose, developed by B.F.Goodrich. Instead of wire, this hose is reinforced with a continuous coil of hemp rope, buried in thick rubber, so it springs back to its round shape after being crushed. In spite of being run over countless times by shuttle cars and other equipment, this B.F.Goodrich hose lasts four times as long as the hose used before, saves the mine an estimated 75% in maintenance costs.

Smooth take-off

For many years an eastern gelatin manufacturer used cotton duck conveyor belts for "take-off" operations. Then a B.F.Goodrich distributor sold the company a lightweight belt made of Koroseal flexible material. It worked so well that five more B.F.Goodrich Koroseal belts were installed recently. Distributor reports that these belts not only do a better job, but are also more economical.

Chute works

A mining company in Michigan recently ordered Grade 1172 rubber sheeting from a B.F.Goodrich distributor for lining slurry chutes. Choice was made after company had made a special test in which this rubber outlasted another material.

Face lifting

A manufacturer of television sets uses a lift truck with a carton clamp device to pick up boxed sets. To prevent slippage and damage to packages, a distributor suggested that the company use pieces of B.F.Goodrich Ribflex conveyor belting to cover the face plates of the clamp. The cover of this belting is made of parallel ribs of flexible rubber, which provide a good surface for gripping smooth boxes.

New product

Rubber dock bumpers: Tough rubber pads for use on all types of loading docks to protect trucks and platforms

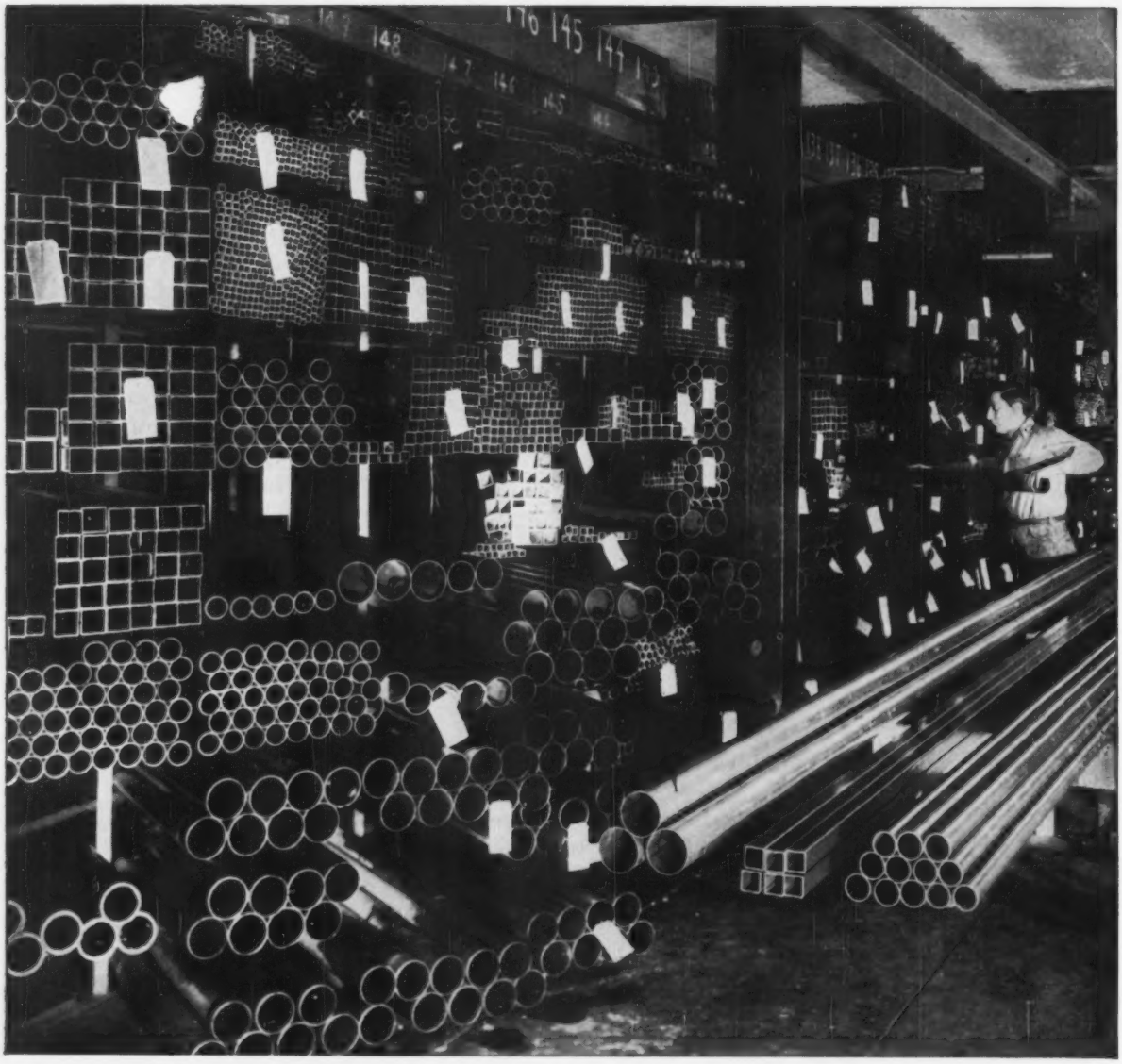
from damage. Bumpers resist impact, abrasion, scuffing, weather. Two types: one all rubber, the other with a metal backing. Ask your B.F.Goodrich distributor for Information Bulletin 758-1.

For more information

For full information about any product described on this page, see your B.F.Goodrich distributor or write *B.F.Goodrich Industrial Products Co., Dept. M-545, Akron 18, Ohio.*

Koroseal—T. M. Reg. U. S. Pat. Off.

B.F.Goodrich
industrial rubber products



The type of tubing you need is here

It pays to analyze your tubing requirements with a Ryerson tubing specialist. He is well qualified to help you select the right tubing for your purpose from Ryerson's diversified stocks.

The Ryerson specialist knows tubing—knows what will work best and why. In many cases, he can recommend a type that will do a better job for you—perhaps a newer type that will save you money, either in first cost or in the cost of using it.

Ryerson carries the nation's largest stocks of steel tubing—all of certified quality—and uses the finest modern equipment to cut to your exact specifications. And Ryerson delivers fast—one tube or a thousand.

The Ryerson tubing specialist is as close as your telephone. Give him a call today.

RYERSON CERTIFIED QUALITY

RYERSON STEEL®

Member of the INLAND Steel Family

Tubing in stock: Seamless and welded mechanical tubing; fluid line, pump cylinder and structural tubing; stainless pipe and tubing; PVC pipe and fittings. Also, aluminum tubing in many plants.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE • CINCINNATI • CLEVELAND DETROIT • PITTSBURGH • BUFFALO • INDIANAPOLIS • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

Steel Company Profits: Whose Business Are They?

Talking to labor people you get the idea that profits are for the workers only.

Few labor bigwigs recall that many times when profits were not so good they were interested in a pay raise, not in the company's problems. Now we will see a complete switch by the same labor bosses. They will use a better profit picture as a reason why the boys ought to get more.

There really is nothing much to negotiate this year in steel. Steel workers are about the best paid in the land with one or two exceptions. The cost of living is not galloping over pay rates. Overtime is picking up. More men are being rehired.

This year the ability to pay will be a keynote of the union. In other years when things were less than rosy, ability to pay was soft-pedaled.

Steel labor chiefs say they are going after all they can get. They will use all the power and propaganda they possess to push their demands.

But let's get back to profits in steel. They belong to the stockholders. Management is really a trustee to see that the business makes a profit.

The Government snares 52 per cent of all the profits steel companies make. The more they make the more is contributed toward a solvent nation.

Even so, the profit figures are misleading. They are reported in today's dollars. They are not comparable with figures of other years because the dollar itself isn't worth as much. So present profit figures are overstated as to actual worth. The stockholder is not protected as is some labor with an escalator or cost-of-living clause.

New machinery that supports high wages came partially from profits. Steel firms have only what they get for their products. Out of that come wages and materials; and new plant and equipment to the extent that depreciation does not foot this bill—and that is considerable.

The smaller the profits the less the government collects, the less machinery is replaced, and the less there is for the stockholder.

If profits are too low the industry will be weak and unhealthy. If they are too high, competition and government taxes will take care of that.

But let's get one thing straight. Unless we are already in a socialistic state, steel company profits are not the business of labor chiefs or of Congressmen, except to the extent that inadequate profits are bad for everyone.

Tom Campbell

Editor-in-Chief

Up at Manitowoc, Wisconsin they're laying the keel for the biggest, most powerful ore carrier ever designed for the Great Lakes. By autumn she'll be ready for launching and next spring will join the Inland fleet, carrying raw materials to Inland's Indiana Harbor Works. She'll be big—a veritable giant among ships—longer than a 50-story skyscraper is high. And she'll be hungry—gobbling more than 50,000,000 pounds of iron ore at a feeding. Her name? The "Edward L. Ryerson," after the former Inland chairman, and one of the oldest names in steel. She'll bear the name proudly while making her contribution to Inland's long-range expansion program—a program designed to meet the growing needs of industrial Mid-America, now and in the future.

Building today, with an eye to tomorrow

RESERVED FOR FALL, 1959

INLAND STEEL COMPANY
30 West Monroe Street • Chicago 3, Illinois
Sales Offices: Chicago • Davenport • Detroit • Houston • Indianapolis
Kansas City • Milwaukee • New York • St. Louis • St. Paul

Other Members of the Inland Family
JOSEPH T. RYERSON & SON, INC.
INLAND STEEL PRODUCTS COMPANY
INLAND STEEL CONTAINER COMPANY*
INLAND LIME & STONE COMPANY* *Division

Machine Speeds Galvanize

Hot-dip galvanizing of small parts via racks or baskets no longer needs crews of skilled workers. A new setup quickly adapts to either method to offer full automatic control of the galvanizing cycle to produce top quality coatings. One, or at most two, unskilled worker-operators can turn out 3000-5000 lb of small parts (weighing up to 1 lb apiece) per hour.

Lithium Improves Stainless

Addition of a very small amount (0.03 pct) of lithium to an austenitic stainless steel results in important improvements, according to a recent technical report. It's claimed that lithium reduces austenitic grain size, lowers deleterious gas content and inclusion count, and improves forgeability and high-temperature properties. Lithium is added to the melt in combination with silicon, iron and silicon, or aluminum.

Harden with Sheet Explosive

Developmental work on sheet explosives for use in metal forming is well under way. While general applications have aimed at explosive forming, there are some cases where the sheet explosive is being used for hardening manganese steels for die work. This line of interest is being persued actively by aircraft manufacturers.

Automation for Barrel Dip

Just announced is a new, self-operating barrel dip unit that is compatible with present monorail systems. This will make possible integration of series of dip processes, such as plating, phosphate coating, galvanizing, etc. The setup will give smaller plants advantages of low-cost automation for finishing end products without extensive plant changes.

Meteorites Aid Space Study

Metallic meteorites help spell out the magnitude of high-velocity space travel, especially concerning the re-entry problem. Flight markings that appear on many meteorites confirm that molten metal is swept away in entering atmosphere. Direct vaporization of the surface may also contribute to material losses according to the report of a recent research program.

Line up with Steel Output

Look for purchasing by steel mills to line up more closely with production rates once the labor agreement is resolved. According to one scrap buyer, current orders are strictly for use in the 30 days. His mill is buying on the same basis as last year with no attempt to build inventory.

Slow in Labor Law Change

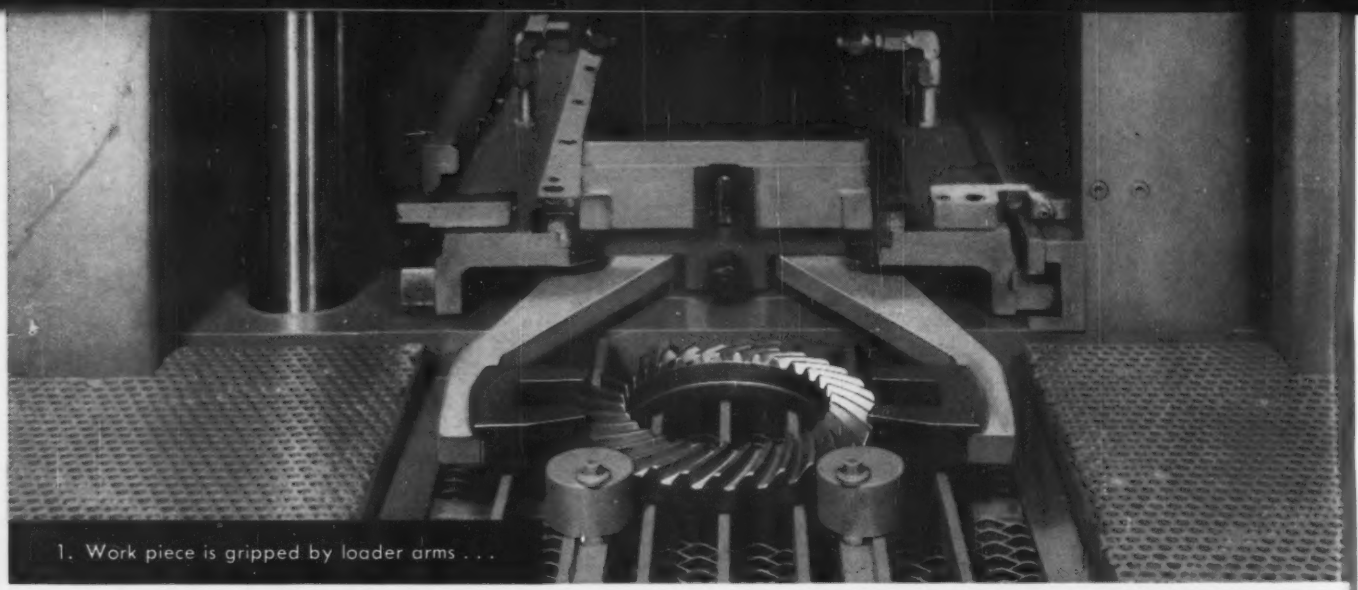
Union officials in Washington grow short-tempered over the slowness of Congress to rewrite the Taft-Hartley law to their liking. Congress has now been in session nearly three months and the union reform timetable is far behind schedule. Some house members, elected in part with union money, are now openly balking the prodding of labor leaders.

Adhesives for Auto Engines

Several aluminum automobile engines due this fall may be glued together. Automakers are testing high-temperature resistant adhesives (400°F range) for use in bonding sections of aluminum engines together. Belief is that engine blocks must be die cast in several sections in order to maintain necessary tolerances.

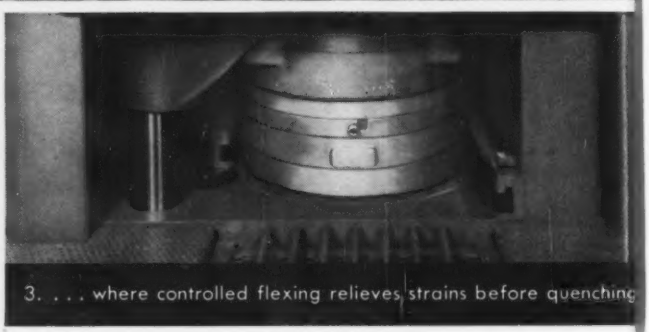
Red China Ships to USSR

Red China's economic thrust in Asia has abated, apparently as a result of Russian demands for payment of "aid" to the Chinese. In recent months, a long list of products has been dumped in non-communist areas of southeast Asia and Europe at depressed prices. Lately, however, this offensive has died down as the volume of shipments directly to the Soviets has increased.



1. Work piece is gripped by loader arms . . .

2. . . . which move piece to quenching die . . .



3. . . . where controlled flexing relieves strains before quenching

New Gleason machine quenches gears *3 times faster* with minimum distortion

The unique, fully automatic method incorporated into the new Gleason No. 117 Quenching Machine makes it possible to quench gears and other parts faster than ever before without significant distortion.

The machine discharges a piece every 30 seconds; accommodates 17 pieces in process at one time.

Automatic handling. Once a part is deposited at the front of the machine, the No. 117 positions it on a quenching die and then clamps, flexes, and quenches it. Initial quenching takes only about ten seconds.

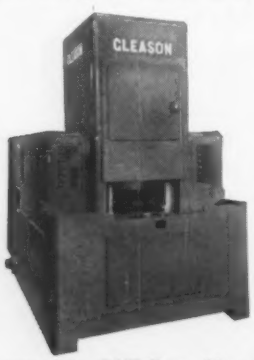
When the part cools past the critical hardening temperature, it is released from the dies. Still immersed in oil, the part then cools completely as it travels on a conveyor to the unload chute. As soon as part is released from dies, the machine is ready to receive another work piece.

Flexing before quenching. Each hot part is flexed between the dies to relieve internal stresses. Rate and number of flexes are easily preset. Hydraulic pressure produces positive diaphragming action.

Pulsing. All pressure on the work is pulsed momentarily throughout the die-quench. This permits work to contract without strain. During the die-quench, oil flows uniformly over and around the part.

Faster production. You can speed up production materially with the Gleason No. 117 Quenching Machine. It handles ring gears and cylindrical parts up to 10½" in diameter and 8" high. You can connect it with any conventional furnace so that parts are automatically fed to the quenching press. Push-button controls and timers are adjustable and easy to set. Dies can be changed quickly and easily.

Gleason engineers are ready to help you step up productivity with this new machine. For complete details, write for bulletin.



Gleason No. 117 Quenching Machine

GLEASON WORKS

1000 UNIVERSITY AVE., ROCHESTER 3, N.Y.

LETTERS FROM READERS

Crazy Talk

▪ In his Feb. 26 editorial (Really Crazy Talk — That's What We're Getting) Editor-in-Chief Tom Campbell called attention to the danger in too much federal planning.

Sir—This editorial should appear in every newspaper in the country. In my opinion it deals with the No. 1 problem facing the people today; that of creeping government controls. Keep up the good work!—W. W. Day, The Masland Duraleather Co., Philadelphia.

Sir—My mental grip had weakened to the point where I was just about to slide over the edge into the void for individualists so carefully fabricated by Big Brother.

Hanging by my mental fingertips and knowing the end was near, I repeated my doctrine again—Thomas Jefferson, Thomas Edison, Charles Steinmetz, Ben Franklin. Where had I gone wrong? Could it be that that padded cell was meant to be my resting place. Suddenly a firm hand reached out of the editorial page in the Feb. 26 issue of The IRON AGE. My balance and stability are restored—I will fight on. —L. Guilfoyle, Hooper-Byrne Co., Montclair, N. J.

Sir—I am indebted to you for this editorial. It was reminiscent of the glorious fights which we had on direct controls during and following World War II when I used to characterize stand-by controls as the sword of Damocles held over the heads of producers which could be effectively used to socialize production of goods and the entire economy.

I have been alarmed at the resurgence of these attempts. Although there seems to be little danger that they will be accepted as a matter of government policy, there is always the danger that they will be enacted. —J. P. Wolcott, Chairman, Federal Deposit Insurance Corp.

"Now what's this unusual plan you have for decentralizing operations?"

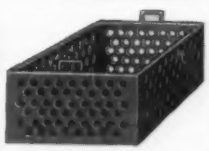
Pat on the Back

Sir—Your recent editorials on the current economic situation as related to the steel industry are consistent with our own thinking.

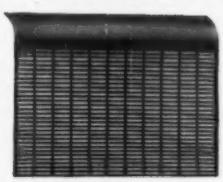
At the present time we are conducting an 18-week course for factory and management people based on the U. S. Chamber of Commerce Economic Discussion Workshop Program.

As your editorials have considerable bearing on the subject our people are discussing we'd appreciate your forwarding 6 copies of each editorial for use on our bulletin boards.—H. W. Wehe, Jr., Vice Pres., Overly Mfg. Co.

Perforated Metal Products and Parts



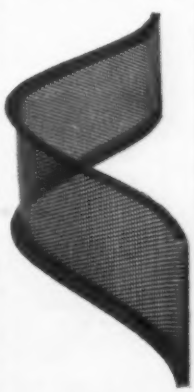
Pickling Basket



Air Inlet Screen for Oil Burner

We, of course, supply manufacturers with perforated metal sheets and plates in a wide variety of sizes and shapes, from which they produce their own products and parts, but we are also fully equipped to relieve them of a great deal of this work. We weld, spot-weld, or rivet, stiffeners and angles to the pieces and can form or flange them to special shapes as required. The items here shown are typical of hundreds we have furnished to other manufacturers during nearly a half century of successful experience.

YOU'LL SAVE MONEY in most cases, by placing orders with us for perforated metal parts, to be delivered in lots throughout the year in accordance with your production schedules. Specialized equipment and procedures will usually enable us to do the work at lower cost than it could be done in your own shops.



Perforated Metal, spot-welded to specially formed angles.

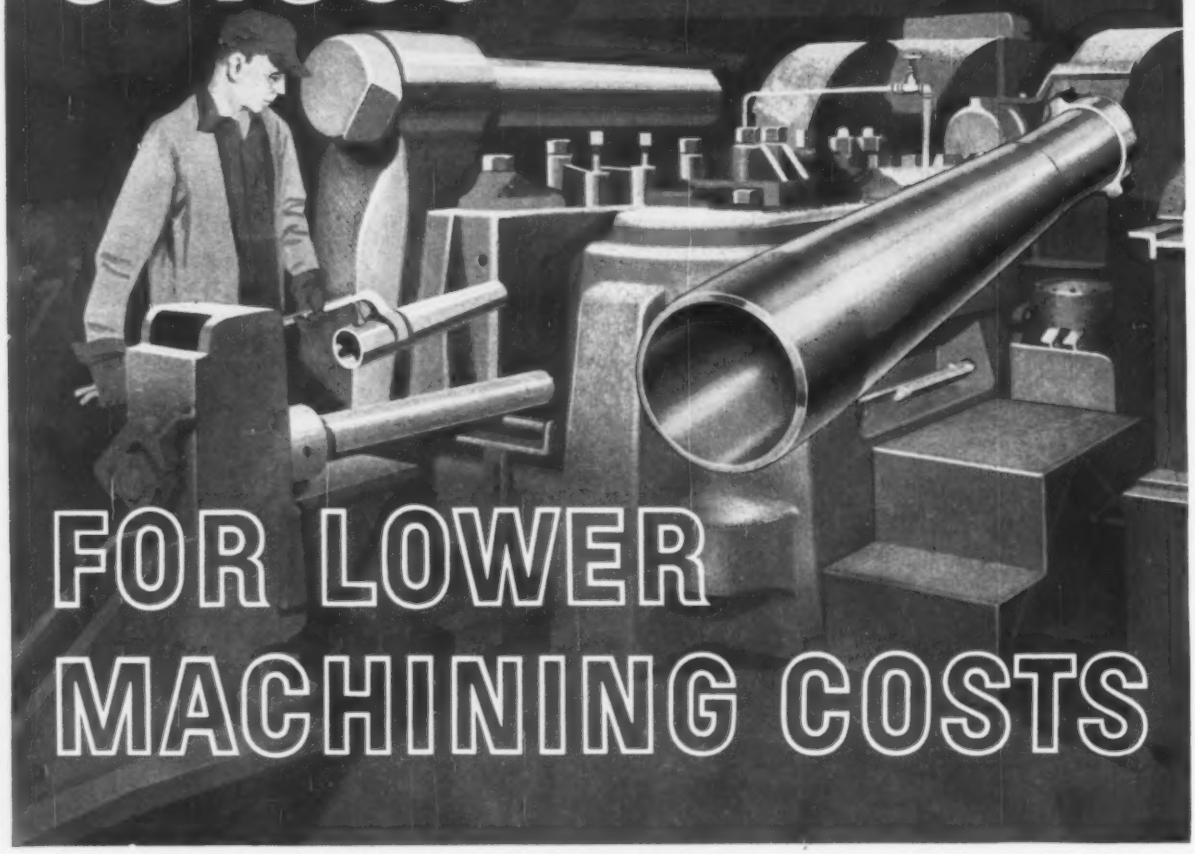
Send us your blue prints and specifications. When given sufficient information, our engineers are often able to make money-saving suggestions and always welcome an opportunity to do so.

DIAMOND MANUFACTURING CO., WYOMING (Wilkes-Barre Area) PENNA.

New Bulletin No. 51, Describes DIAMONTEX Perforated Metal Lay-in Panels for Modern Acoustical Ceilings.

Aircraft Components Manufacturer Specifies

OSTUCO *Forged Tubing*



FOR LOWER MACHINING COSTS

Forging tube end in Shelby mill. In addition, Ohio Seamless can supply tubing flared, swaged, expanded, upset, flanged, shaped, etc.

"Our machining time on this landing gear part in SAE 4140 plummeted from *400 to 180 minutes* when we changed from forgings to Ostuco Forged Tubing.

"In addition to getting *over 80% more parts per workshift*, we like the free-machining qualities of Ostuco tubing that give us extra savings in set-up time and tool grinding costs . . . "

These actual figures, from an eastern manufacturer, indicate the machining economies Ostuco Forged Tubing can effect in your product. The starting point is to call your nearest Ohio Seamless office, listed in the Yellow Pages, or the plant at *Shelby, Ohio — Birthplace of the Seamless Steel Tube Industry in America.*

AA-8310

OSTUCO SHELBY OHIO — OSTUCO TUBING

OHIO SEAMLESS TUBE DIVISION

of Copperweld Steel Company · SHELBY, OHIO

Seamless and Electric Resistance Welded Steel Tubing • Fabricating and Forging

SALES OFFICES: Birmingham, Charlotte, Chicago (Oak Park), Cleveland, Dayton, Denver, Detroit (Huntington Woods), Houston, Los Angeles (Lynwood), Moline, New Orleans (Chalmette), New York, North Kansas City, Philadelphia (Wynnewood), Pittsburgh, Rochester, St. Louis, St. Paul, St. Petersburgh, Salt Lake City, Seattle, Tulsa, Wichita CANADA: Railway & Power Engr. Corp., Ltd. EXPORT: Copperweld Steel International Company, 225 Broadway, New York 7, New York

FATIGUE CRACKS

Labor Reform

Labor (with a capital L) is in bad with the general public. The McClellan investigation has turned up quite a few instances of corruption involving labor leaders and racketeers. There seems to be no end to the parade of union officials who have pleaded the Fifth Amendment when confronted with pointed questions about their stewardship.

So the demand for new laws to protect the union rank-and-file, business, and the public from the chicanery of the thugs and racketeers in the labor movement was inevitable. As a result, three bills calling for labor reform are now before the Congress.

The question is, which one will pass and which one won't. What are the differences between the laws proposed by Senator Kennedy, the Administration, and Senator McClellan? You needn't wonder any longer.

For the lowdown on how it's likely to work out, just turn to page 82. It's another in our continuing series on the Labor-Management Crisis of 1959.

Coming Events

As new alloys are developed for nuclear and Space Age applications, the demands on fabricators and welding equipment makers keep increasing. That's because welding processes and materials must keep pace with this growing number of "impossible-to-weld" metals.

And that's why next week's magazine—our special Welding Show Issue—will devote 16 pages to the latest advances in welding.

Included will be articles on how to select welding currents, on electron beam welding, and on tape-controlled welding for high production jobs.

Puzzler

This puzzler should be a cinch in these times, when we all have to juggle our purchasing power.

Four robbers bind a bank guard and rob a vault stored with silver dollars. They divide the money in this way: "A" gets one fourth, "B" one fourth of the remainder, "C" one fourth of what is left, and "D" one fourth of the balance. What remains after that is divided equally among "A," "B," "C" and "D."

But in counting it out, in the first division three of the dollars were found to be counterfeit. These were left in the box, the remainder dividing into four equal parts.

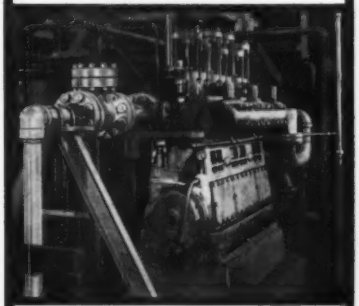
In the second division there was a remainder of two, one of which was also found to be counterfeit and left in the box. The other was given to the guard.

In the third division there was also a remainder of two, which went to the guard. In the fourth division, the remainder was three, which also went to the guard. In the final division, the pile was divided equally into four parts.

How many good dollars were found in the vault, and how were they divided?

"And then with a mere flick of a finger the typewriter disappears . . . it's right here . . . or here. . . ."

COMPLETE CENTRAL HYDRAULIC SYSTEMS FOR



die casting

extruding

plastics molding

From Aldrich you get all the benefits of unified engineering plus the newest in pumping equipment. Aldrich Direct Flow Pumps to 2500 hp. Aldrich-Groff Controllable Capacity pumps to 125 hp. Pressures to meet your requirements. Write for data.

LOWER PUMPING COSTS WITH

ALDRICH

Aldrich Pump Company
8 Pine Street, Allentown, Penna.

INDUCTOMELTING MEANS*

LOWER METAL LOSSES

Metal losses, as encountered in conventional melting practices, are reduced to insignificance by INDUCTOMELTING. The savings realized with Inducto melting equipment, though substantial in all metals, are particularly great in the easily oxidized or volatile alloying materials.

One non-ferrous foundry cut melting losses 80% through INDUCTOMELTING. This was made possible by higher melting speeds and the remelting of chips and turnings from machined castings which could not be done with the previous equipment without extremely high metal losses.

Why? Why should Inducto melting equipment provide such savings in metal? Because every component is designed and selected for the highest possible efficiency so that you can attain all the benefits of high-frequency induction melting at its best. With Inducto equipment, you get the highest possible melting speeds and the most accurate temperature control in the melting field today. Write for complete details—ask for Bulletin 70. Inductotherm Corporation, 412 Illinois Ave., Delanco, N. J.

**INDUCTOMELTING is high-frequency induction melting PLUS the additional advantages of Inducto design features and engineering techniques.*

INDUCTOTHERM

INDUCTO ... the mark of modern melting

COMING EXHIBITS

1959 Nuclear Congress—Apr. 5-9, Cleveland Auditorium, Cleveland. (Engineers Joint Council, 29 W. 39th St., New York 18.)

Welding Show—Apr. 6-10, International Amphitheatre, Chicago (American Welding Society, 33 W. 39th St., New York.)

Engineered Castings Show — Apr. 13-17, Sherman and Morrison Hotels, Chicago. (American Foundrymen's Society, Golf & Wolf Rds., Des Plaines, Ill.)

Packaging Exposition—Apr. 13-17, International Amphitheatre, Chicago. (American Management Assn., 1515 Broadway, N. Y.)

Powder Metallurgy Show — Apr. 20-22, Sheraton - Cadillac Hotel, Detroit. (Metal Powder Industries Federation, 130 W. 42nd St., New York 36.)

Design Engineering Show — May 25-28, Convention Hall, Philadelphia. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Material Handling Show — June 9-12, Public Auditorium, Cleveland. (Hanson & Shea, Inc., One Gateway Center, Pittsburgh 22.)

Industrial Finishing Show — June 15-19, Detroit Artillery Armory, Detroit. (Information: H. J. McAleer, 3171 Bellevue, Detroit 7, Mich.)

MEETINGS

APRIL

Gas Appliance Manufacturers Assn. —Annual meeting, Apr. 1-3, Americana Hotel, Bal Harbour, Fla. Association headquarters, 60 E. 42nd St., New York.

Specific measures to resist Russian economic aggression will be discussed by top national business and

(Continued on P. 16)

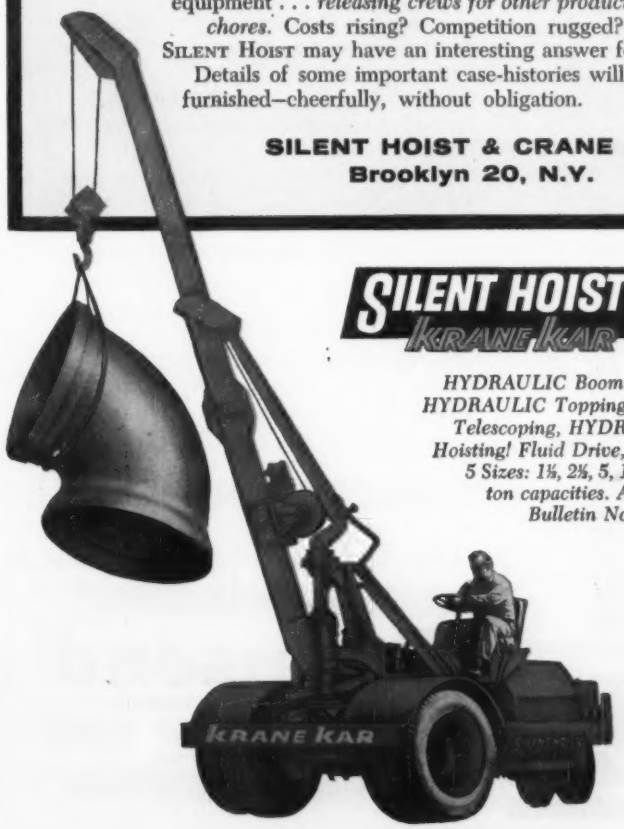
SILENT HOIST LIFTRUK

9 sizes: 3, 5, 6, 7½, 8, 10, 12, 15, 30 tons capacity. Fluid Drive, Power Steering. Write for Bulletin No. 77.

shrink days into hours...

Tedious, costly work of Loading, Unloading and Stacking that take many men, many days can be compressed into a few hours . . . with just *one* man operating SILENT HOIST materials handling equipment . . . *releasing crews for other productive chores.* Costs rising? Competition rugged? SILENT HOIST may have an interesting answer for you! Details of some important case-histories will be furnished—cheerfully, without obligation.

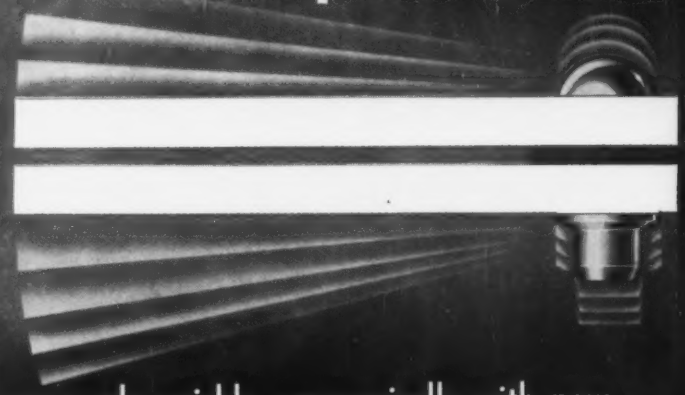
SILENT HOIST & CRANE CO.
Brooklyn 20, N.Y.



SILENT HOIST KRANE KAR

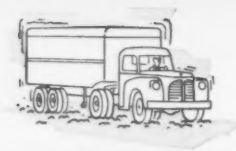
HYDRAULIC Boom Swinging, HYDRAULIC Topping, HYDRAULIC Telescoping, HYDRAULIC Load Hoisting! Fluid Drive, Power Steering. 5 Sizes: 1½, 2½, 5, 10, 12½ ton capacities. Ask for Bulletin No. 79.

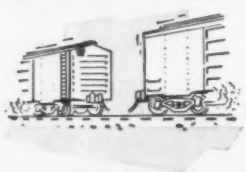
Vibration-proof joints



now made quickly, economically with new

TOWNSEND VERSA-LOCKBOLT





With the new Townsend Versa-Lockbolt* you get the same high tensile values as with the standard type but they cost less and are easier to install.

Wider grip ranges in a given size are provided by additional locking grooves. Other design changes make it feasible to use them in relatively oversized holes. Inspection time is reduced since hole size is less critical.

These features make for flexibility of design—make calculations simpler and more accurate.

Versa-Lockbolt installation is fast and guns provide uniform draw down or clinch —locking the collar with up to five tons of pressure. The new collar with its flanged integral washer makes it especially suitable for fastening even light gage materials.

For more information on how to get new vibration-proof fastening economy, write Townsend Company, P.O. Box 237-B, New Brighton, Pa.

*Licensed under Huck patents RE 22,792; 2,114,493; 2,527,307 2,531,048; 2,531,049 and 2,754,703

The Fastening Authority

Townsend

COMPANY • ESTABLISHED 1816

[illegible], PENNSYLVANIA

Sales Offices in Principal Cities

[illegible] • Santa Ana, California

EXHIBITS, MEETINGS

(Continued from P. 15)

military leaders at the Fifth National Military - Industrial Conference meeting at the Palmer House, Chicago, April 6-8. Conference headquarters are at 140 S. Dearborn, Chicago 3.

National Assn. of Waste Material Dealers, Inc.—Annual convention, Apr. 6-8, Edgewater Beach Hotel, Chicago. Association headquarters, 271 Madison Ave., New York.

Building Research Institute — Annual meeting, Apr. 6-8, Penn Sheraton Hotel, Pittburgh. Institute headquarters, 2101 Constitution Ave., Washington 25, D. C.

American Hot Dip Galvanizers Assn., Inc.—Annual meeting, Apr. 7-8, Empress Hotel, Miami Beach, Fla. Association headquarters, 1806 First National Bank Bldg., Pittsburgh.

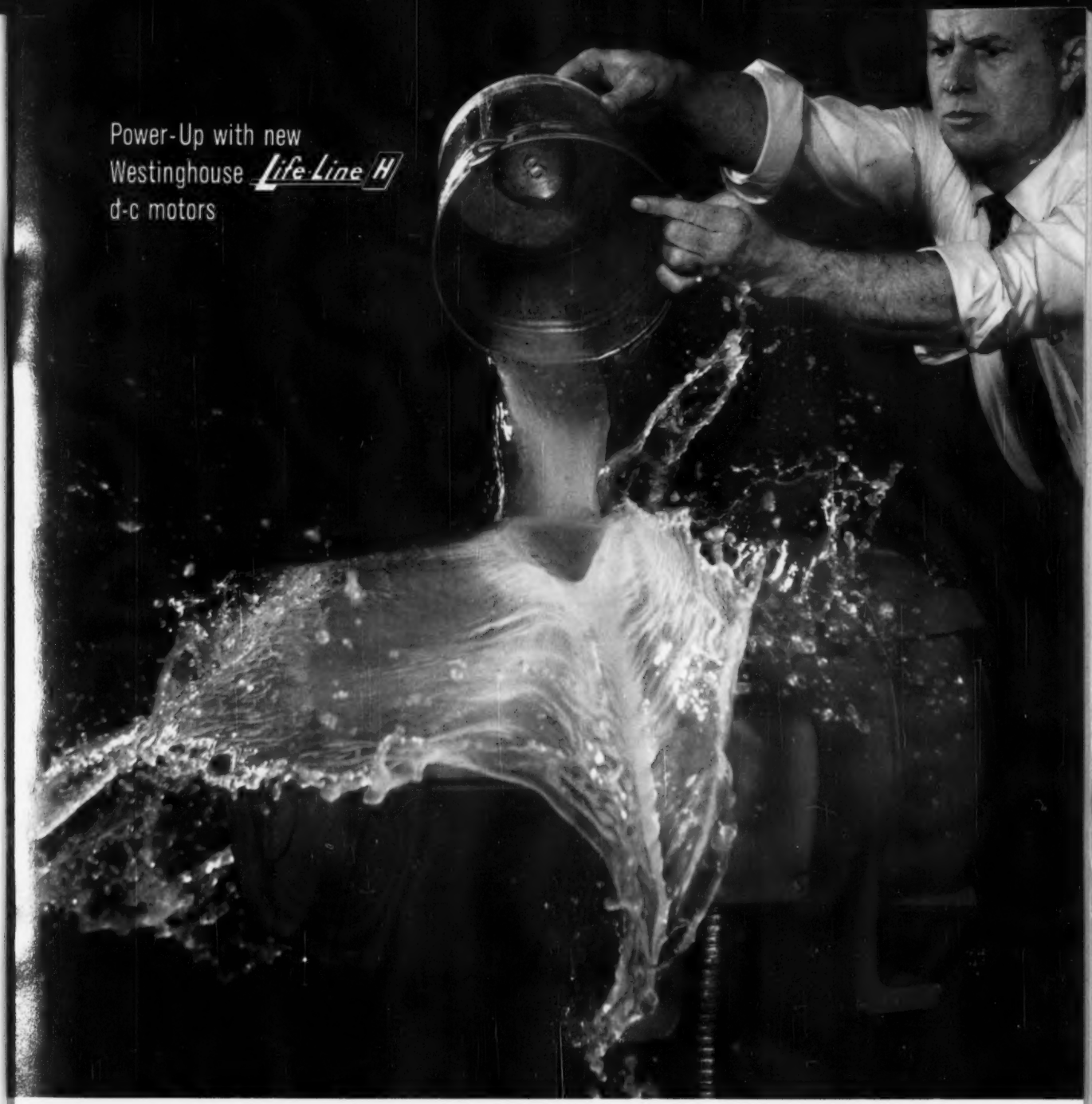
National Assn. of Architectural Metal Mfrs.—Annual convention, Apr. 12-17, Hotel Monteleone, New Orleans, La. Association headquarters, 228 N. LaSalle St., Chicago.

Steel Shipping Container Institute, Inc.—Annual meeting, Apr. 14-16, Kenilworth Hotel, Miami Beach, Fla. Institute headquarters, 600 Fifth Ave., New York.

National Petroleum Assn.—Semiannual meeting, Apr. 15-17, Cleveland Hotel, Cleveland. Association headquarters, Munsey Bldg., Rm. 958, Washington 4, D. C.

Association of Roller & Silent Chain Manufacturers—Spring meeting, Apr. 16-17, Drake Hotel, Chicago. Association headquarters, 3343 Central Ave., Indianapolis.

American Institute of Steel Construction, Inc.—National engineering conference, Apr. 16-17, The Dinkler - Tutwiler Hotel, Birmingham, Ala. Institute headquarters, 101 Park Ave., New York.



Greater protection . . . maximum reliability . . . longer, trouble-free life

HERE'S WHY: The rugged new Westinghouse Life-Line "H" d-c motor gives you the most complete and advanced protection available in dripproof industrial d-c machines. Elimination of uncovered side openings . . . use of heavy, cast end brackets . . . effective seals throughout . . . all combine to provide outstanding resistance to liquids, vapors and dirt. For these reasons you can count on the Life-Line "H" to give you greater reliability with a minimum amount of maintenance under *all* operating conditions.

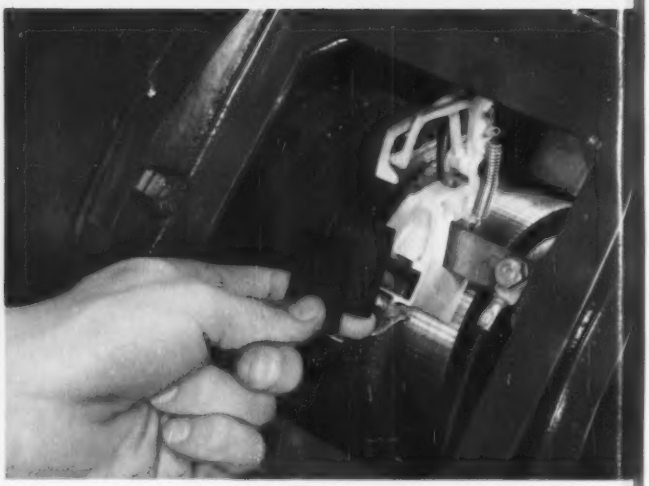
Plus . . . these other important advantages .....

YOU CAN BE SURE...IF IT'S Westinghouse

These exclusive features of the new Westinghouse Life-Line H d-c motor guarantee top performance . . . longer, trouble-free life

TEN TIMES LONGER INSULATION LIFE . . . New silicone insulation in Westinghouse Life-Line* "H" d-c motors and generators stands up under temperatures which turn ordinary insulation to a cinder. High-temperature silicone insulation is used with the full complement of iron and copper required for low Class B temperature. Result: Life-Line "H" shrugs off emergency overloads and abnormal ambients to keep production rolling, maintenance down.

CLEANER, COOLER OPERATION results from new controlled ventilation system of Life-Line "H." Ordinary d-c motors draw air in at commutator end, contaminate windings by drawing carbon dust from commutator brush wear *into* the machine. Life-Line "H" reverses this flow. Air and carbon dust are expelled at commutator end . . . assuring cleaner, cooler windings . . . longer motor life . . . less maintenance.



FASTEST RESPONSE . . . 35 per cent increase in commutating ability . . . up to 55 per cent lower mechanical inertia . . . and up to 30 per cent reduction in electrical inertia mean that the new Westinghouse Life-Line "H" d-c motor provides the fastest acceleration, quickest reversing and closest speed regulation. This means more production, better product quality, minimum complexity of control.

SIMPLIFIED MAINTENANCE . . . With the new Life-Line "H," maintenance is not only substantially reduced but periodic inspections are also greatly simplified. For example: as shown above, Uniforce brushholder fingers lock out . . . brushes can be inspected or changed with one hand. And Uniforce tension remains constant throughout brush life . . . no need to adjust pressure as brushes wear.

For information about the ways you can profitably put the new Life-Line "H" motor to work, contact your nearby Westinghouse representative. Or, write Westinghouse Electric Corporation, P. O. Box 868, 3 Gateway Center, Pittsburgh 30, Pa. JI-22121

YOU CAN BE SURE...IF IT'S Westinghouse

MORE ABOUT THE GARLOCK **2,000**

HOW LIP INTERFERENCE AND HEEL CLEARANCE IMPROVE CHEVRON* PACKING DESIGN

There are many reasons why users prefer famous Garlock CHEVRON Packings for sealing rams or rods on hydraulic systems. Design refinements indicated in the drawing above are just two examples:

Heel clearance for easy installation. Experience has shown that unless adequate clearance is provided at the heel of a V-type packing ring it can be very difficult to insert in the stuffing box. The heel clearance on Garlock CHEVRON Rings has proved to be the ideal for easy installation without disturbing the unique advantages of the CHEVRON design.

Lip interference for sealing at low pressures. If the lip of a V-type packing is made exactly to nominal size, and all the clearance taken at the heel, leakage past the lip often occurs at low or zero pressures. On the other hand, too much interference at the lip generates excessive friction resulting in scoring and wear. The lip interference on Garlock CHEVRON Packing is your assurance of minimum friction and positive sealing at all pressures.

There are many other design advantages of Garlock CHEVRON including its hinge-like construction which automatically compensates for pressure changes. If you have a sealing problem involving lubricants, liquids, or solvents at temperatures ranging from −320°F to +600°F, why not find out more about the many forms of Garlock CHEVRON Packings available.

CHEVRON Packings are another important part of the Garlock 2,000 . . . two thousand different styles of packings, gaskets, and seals for all your needs. Call your local Garlock representative or write for Folder AD-115.

*Registered Trade Mark

THE GARLOCK PACKING COMPANY, Palmyra, N. Y.

For Prompt Service, contact one of our 30 sales offices and warehouses throughout the U. S. and Canada.

GARLOCK

Packings, Gaskets, Oil Seals, Mechanical Seals, Molded and Extruded Rubber, Plastic Products

Canadian Division: The Garlock Packing Co. of Canada Ltd.

Plastics Division: United States Gasket Company

HARBISON-WALKER HISTORY OF PROGRESS IN REFRACTORIES FOR THE ALL-BASIC OPEN HEARTH FURNACE

Harbison-Walker Refractories Company from its first beginnings, in 1865, only several years short of a century ago, has closely worked with the iron and steel industries in the production of refractories needed to make possible the rapid evolutionary advances in furnace practice. This progress involves increased severity of operating conditions including much higher temperatures and larger furnaces with increased rates of production, accompanied by the use of oxygen with all its benefits. Rates of steel production based on sizes and designs of furnaces — noteworthy advances in metallurgical practice — and availability of superior refractories, in many instances, have been substantially increased.

in 1916

in 1931

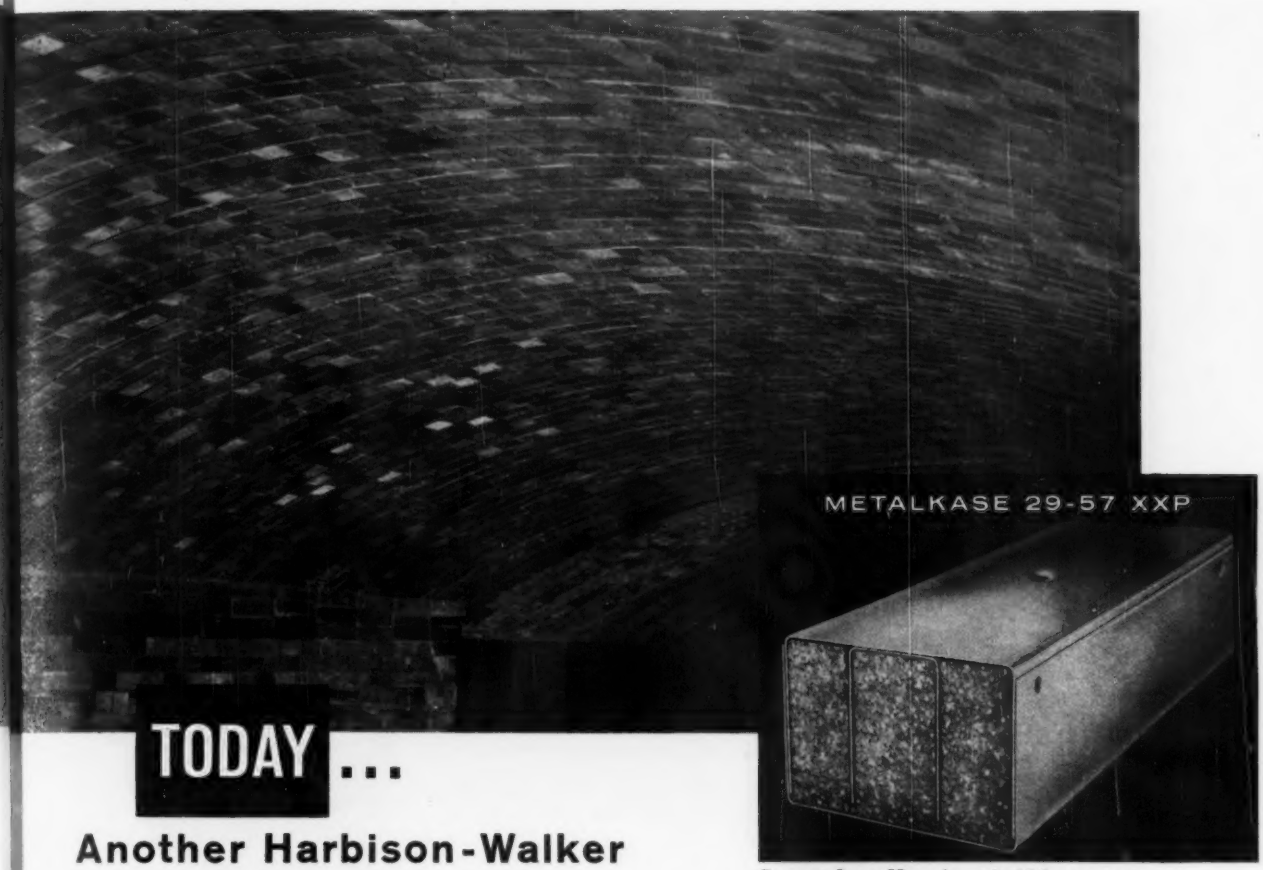
QUOTATIONS FROM LITERATURE OF LONG AGO ILLUSTRATE HARBISON-WALKER'S LEADERSHIP

The Original METALKASE Basic Brick. From Harbison-Walker Manual 1916: "METALKASE BRICK, a refractory of ingenious form, developed and perfected through several years' service in actual open hearth practice. After its value in open hearth linings had been completely demonstrated, it was first placed on the market in 1916. These brick have been adopted with highly satisfactory results in many steel plants and under conditions for which they are best suited have given two to three times the service of magnesite brick and many times that of silica brick."

The First Suspended Basic Roof built for Harbison-Walker's pioneering research in 1931. From AIME Proceedings, Volume 106 (1933): "Almost nothing was known regarding the behavior of magnesite brick in suspended construction; the time required for safe heating and cooling, limiting temperatures at which hot patching could be attempted; the effects of relatively high thermal conductivity on hangers; probable heat losses; or the possibility of insulation. In order to secure needed data, an experiment was conducted at the plant of Harbison-Walker Refractories Company at Hays, Pa."

in 1923 . . . Chemically Bonded Basic Brick — In the year 1923 Harbison-Walker introduced the first chemically bonded magnesite-chrome refractory for which patents were granted in 1925. Through ensuing years, many millions of chemically bonded basic brick, a major portion of which were made with the metal casings, have become used as the standard type of basic brick in open hearth steel furnaces.

These important milestones of progress in basic refractories are typical of many others by Harbison-Walker.



TODAY ...

Another Harbison-Walker Basic Open Hearth Roof among the many making service and tonnage records

Sprung Open Hearth roof of METALKASE 29-57 XXP at Homestead Works of United States Steel Corporation.

With the all-basic open hearth furnace becoming an economical reality the production of new refractories having decidedly enhanced properties has been necessary. Harbison-Walker conventional and specialized basic refractories are fully meeting these requirements.

A fundamental factor in the achievement of the all-basic furnace is the metal encased basic brick pioneered more than forty years ago by Harbison-Walker. Through constant research and extensive application experience, rapid evolutionary progress has resulted in the successful use of the metal encased brick for the open hearth roofs as well as for other furnace parts. METALKASE 29-57 XXP internally plated metal encased brick are used in both sprung and suspended open hearth roof constructions of all designs with excellent service records.

An exceedingly important contributor to the excellence of this refractory developed specifically for this requirement, is the high purity magnesia produced by Harbison-Walker from Michigan brines. Fully stabilized as periclase of high density, it is an important constituent of this refractory having outstanding properties for the particular application.

The successful use of basic brick for roofs contributes to greater severity of conditions imposed upon other furnace parts. Harbison-Walker basic refractory products long established with unequalled records, together with the newer specialized brands, fulfill these rigid requirements for bottoms — walls — and regenerator checkers and make the ALL-INCLUSIVE, ALL-BASIC Open Hearth Steel Furnace a reality.

HARBISON-WALKER REFRACTORIES CO.
and Subsidiaries

General Offices: Pittsburgh, Pennsylvania
World's Most Complete Refractories Service

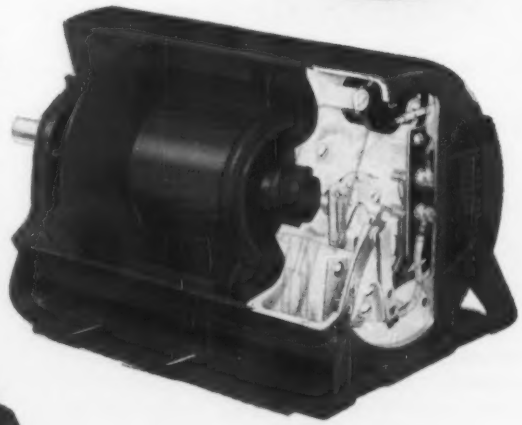
motors for

YOURS
from the case of the
A. O. Smith motor man

Vertical Hollow Shaft Motors 1 to 700 hp
Heavy, solid cast iron frames that can't dent or rust through. Also, sealed bearing chamber . . . metered oil flow . . . dual ventilation. Available in weather-protected, TEFC and explosion-proof models.

Jet Pump Motors 1/3 to 3 hp
Exclusive totally-enclosed end-mounted starting switch—sealed from dust and dirt. Controlled ventilation for uniform cooling of windings and rotating parts. Dust-carrying air is directed *away* from bearings for longer life.

New SEALED CAPSULE Fractional Motors 1/3 to 2 hp
Single-phase fractionals that seal out the biggest single cause of fractional motor failure. The exclusive, adjustable starting switch; the actuator, capacitor, thermostat and terminal board — all totally protected against mechanical damage or contamination . . . by the revolutionary *sealed capsule*. Motors can be mounted in any position. Other features include decibel-conscious application of sealed, prelubricated bearings that brings sleeve-bearing quietness to ball-bearing motors.



Close-Coupled pump and "C" Face Motors 1/3 to 150 hp
Slash installation costs and time. Flange bolts directly to pump casing. Pump impeller mounts directly on shaft. On all close-coupled and "C" face pump motors, extra care is taken on all machine tolerances to assure alignment of pump impellers.

every pump application

domestic
industrial
agricultural

WIDE CHOICE ASSURES PROPER SELECTION

Dependability, rugged construction and design that provides the extra stamina to walk through motor-killing loads are three good reasons why it pays to specify A. O. Smith pump motors — ⅓ to 800 hp.

But more, you get a wide range of HP in every type plus an exceptional range of electrical and mechanical modifications. Result — A. O. Smith pump motors can be matched exactly to the job at hand.

Vertical Solid Shaft Motors ⅓ to 800 hp Feature the same heavy, trouble-free construction as A. O. Smith Vertical Hollow Shaft Motors . . . excess thrust capacity . . . grease-lubricated shielded bearings for added service life.

Horizontal Integral Motors 1 to 800 hp Single or polyphase . . . with every variation. Open weather-proof, TEFC or explosion-proof; all voltages, any insulation required. These motors feature a unique lubrication system with bearings that *can't* be overgreased.

For complete details, see your A. O. Smith motor man or write direct.

Through research A.O. Smith *. . . a better way*

A.O.Smith

CORPORATION

ELECTRIC MOTORS

Tipp City, Ohio

A. O. Smith International S. A., Milwaukee 1, Wisconsin, U. S. A.

Interested in Oxygen? Nitrogen? Argon?

Here's Why "Big Three" For its New Fort

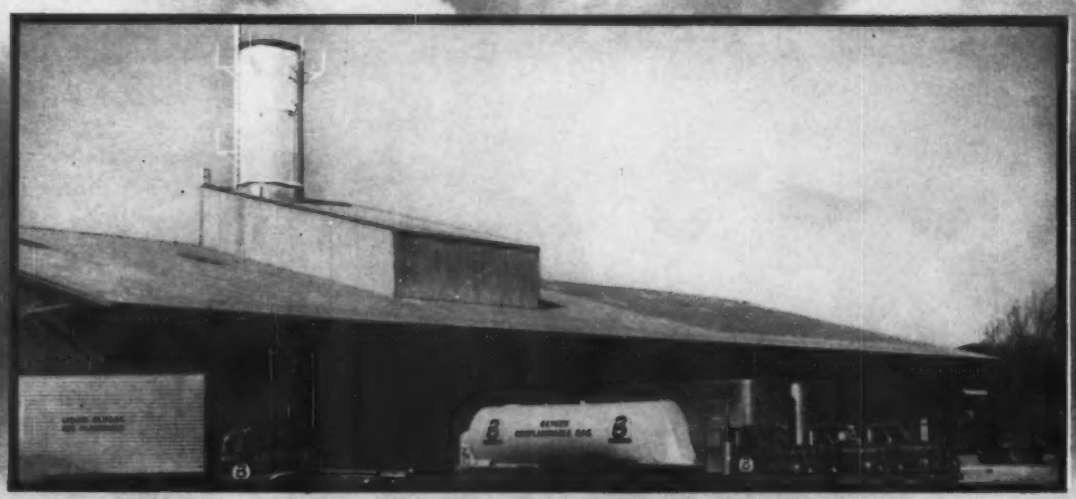
A leading oxygen producer in the Southwest, Big Three, considered very carefully its choice of an engineering firm to design and provide the equipment for a new tonnage plant for the Dallas—Fort Worth area.

That's why they selected Messer for the job!

Messer's long background in this country and abroad has established its reputation as a sound and reliable supplier of air separation plants of all types. In the past two years, Messer has been particularly successful in designing and engineering oxygen-producing equipment of the type Big Three wanted.

HOW IT WORKED OUT

Now that the Messer plant is "on stream" in Fort Worth, what are the results? To quote Mr. C. K. Rickel, Big Three president:



EXCEEDS CAPACITY—Big Three plant at Fort Worth runs above capacity whenever necessary; works efficiently and economically.

Chose MESSER Worth Oxygen Plant

"We are more than pleased with the Messer unit that we installed last summer. It is making its full capacity of oxygen, nitrogen, and argon very efficiently. I would be happy, indeed proud, to show anyone through this plant."

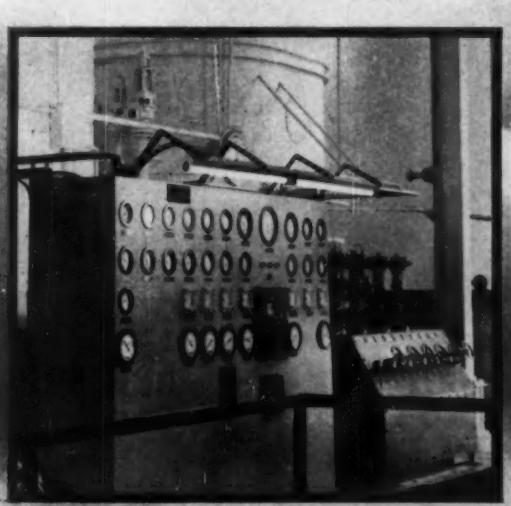
Can *your* business benefit by the installation of tonnage oxygen, nitrogen, or argon producing equipment? If so, be sure to consult American Messer. Your inquiry will be welcomed!

AMERICAN MESSER CORPORATION

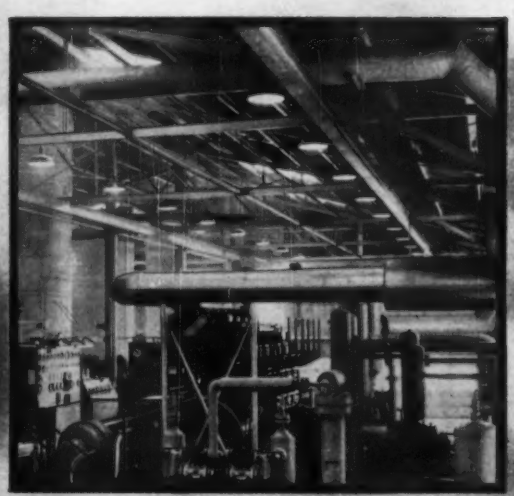
Chrysler Building • 405 Lexington Avenue • New York, N.Y.

THERE IS NO SUBSTITUTE FOR MESSER EXPERIENCE

Messer

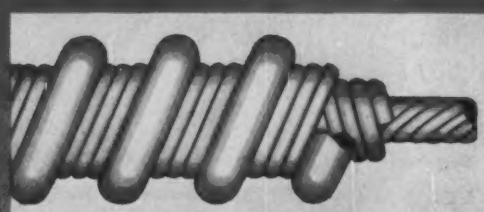


ONE OPERATOR PER SHIFT—Extensive use of automatic controls in Big Three unit requires little attention—only one operator.



REAL POWER ECONOMY—Power for this installation is furnished by an inexpensive natural gas engine—yields products at low cost.

How NS solved another special wire problem



REMOTE CONTROL cable for jet aircraft is made of layers of high-tensile National-Standard wire wound around a stranded core. Heavy outer wire provides helix or worm-gear surface for meshing with hobbed wheels.

Photo courtesy Pan American Airlines

Special National-Standard wire helps fly new jet-liners

When the age of commercial jet transportation in the U.S. began last January, giant jet-liners inaugurated flights across the country at speeds over 600 mph. To control these new aircraft swiftly and easily requires control cables of the utmost reliability, efficiency and endurance.

NEW COMMERCIAL JET-LINERS, as well as many military aircraft, are flying now with a unique remote control cable system made of special high-tensile wire wound around a stranded core with a heavy outer wire of stainless steel wound to a pitch of 10 per inch. This outer wire acts as a helix to engage hobbed wheels within the various system control boxes.

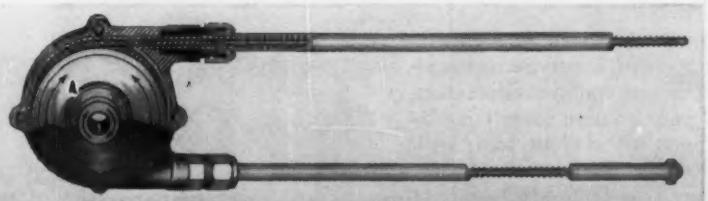
NATIONAL-STANDARD ENGINEERS worked closely with a control-cable system manufacturer to develop wire of just the proper alloy and rugged physical properties required to withstand extreme temperature and flight stress variations. National-Standard submitted wire samples to microstructural studies and physical tests to assist the customer in determining the conditions that would allow bending cable around pulleys without giving a permanent set to the cable. In addition, alloy steels with various coatings were tested to improve wear and galling resistance for various applications. The result was the development of a special stainless-steel wire that exceeded rigid specifications.

EXPERIENCED ENGINEERING HELP, of this kind, for jobs requiring high-quality wire to meet special or unique applications, is available to *you* from National-Standard. For any of the many thousands of applications where only special wire will solve the problem, let National-Standard engineers go to work for you. Write for additional information to National-Standard Company, Niles, Michigan.

Manufacturer of specialty wire and metal products

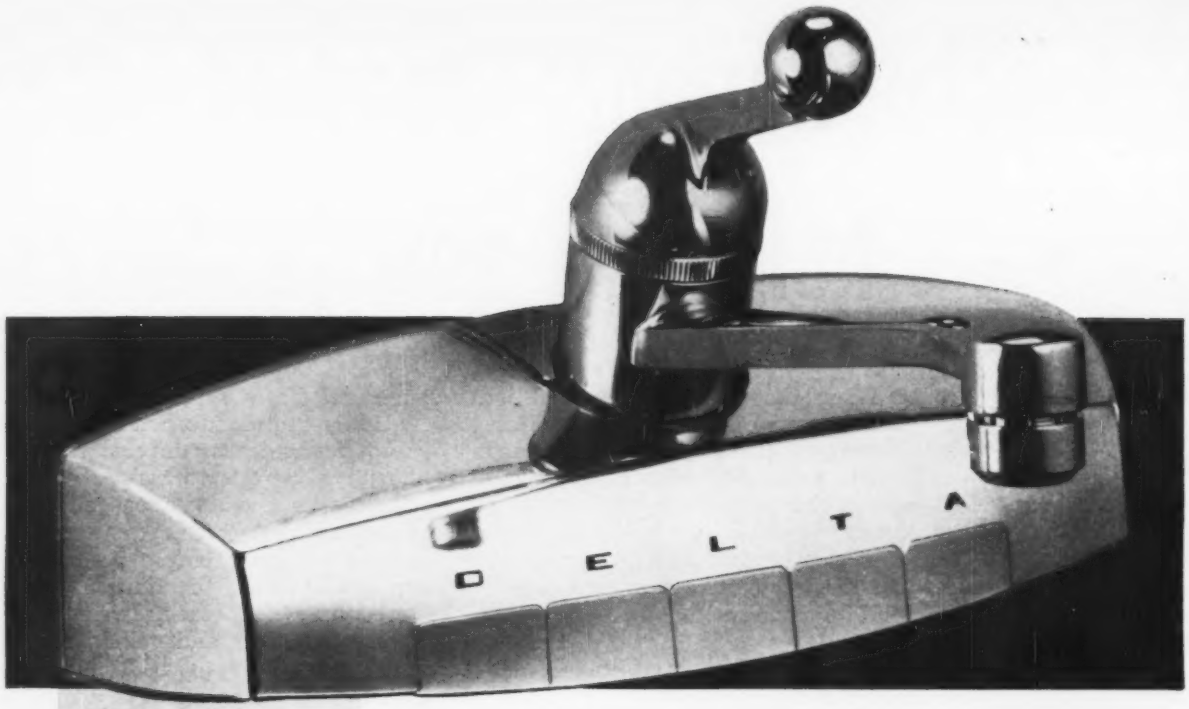
NATIONAL NS NATIONAL-STANDARD Company NILES, MICHIGAN **STANDARD**

DIVISIONS: NATIONAL STANDARD, Niles, Mich.; tire wire, stainless, music spring and plated wires • **WORCESTER WIRE WORKS,** Worcester, Mass.; high and low carbon specialty wires • **WAGNER LITHO MACHINERY,** Secaucus, N. J.; metal decorating equipment • **ATHENIA STEEL,** Clifton, N. J.; flat, high-carbon spring steels • **REYNOLDS WIRE,** Dixon, Ill.; industrial wire cloth • **CROSS PERFORATED METALS,** Carbondale, Pa.; decorative, commercial, and industrial perforated metals.



FLEXIBLE CABLE engages accurately with specially hobbed wheels housed in control boxes. This combination requires special cable wire that will not take permanent set and will provide smooth, hard bearing surface for cable inside conduit.

NATIONAL-STANDARD engineers made intense microstructural and tensile studies of sample wire to find exact physical properties of the alloy to meet strict aircraft control specifications.



More than 150,000 square inches per hour can be metallized in this NRC "Rapid Vacuum Coater". Tank sizes range from 12" diameter by 13" high for laboratory use to 66" diameter by 60" long for high volume production.

Sell It For More Make It For Less

WITH

VACUUM METALLIZING

Even though it is priced at $1.00 more, a vacuum metallized desk novelty outsells a painted model of the same product 10 to 1. Vacuum metallizing helped a reflector manufacturer cut his total cost 65% and his customers liked the new product better.

Vacuum metallizing can give almost any product a gleaming metallic finish in any one of a variety of rich, exciting colors. It hides surface blemishes and permits the use of lower cost base materials. Metallizing costs can run as low as 1/5¢ per square inch.

Clear plastic parts are often metallized on the reverse side to give the appearance of a brilliant metallic piece cast in the plastic. Intricate, multi-colored designs can be economically produced.

You owe it to yourself to get in touch with your nearest NRC engineer. Without obligation, he will evaluate your application, supply metallized samples of your product and estimate your processing cost.

If requirements make it profitable for you to buy your own NRC equipment our engineers are ready to lay out your facility, supply all equipment, supervise its installation and train your operators. If your volume doesn't justify equipment of your own, we'll recommend sources for having your particular kind of work done. Write or phone us today.

NRC

NRC
EQUIPMENT
CORPORATION

DEPT. 35-C, 60 CHARLEMONT ST., NEWTON 61, MASS.
A Subsidiary of National Research Corporation

SALES OFFICES: Atlanta • Boston • Chicago • Cleveland • Houston • Los Angeles • New York • Palo Alto • Pittsburgh

Specify SANDVIK *Precision-Tailored* Spring Steel

FOR ACCURATE FLATNESS, STRAIGHTNESS, WIDTH, GAUGE AND EDGE FINISH *PLUS* SPECIFIC PHYSICAL PROPERTIES

SS-138

When you require specific physical properties combined with accurate dimensions in spring steel, call Sandvik.

From composition, through processing to the finished strip, Sandvik has had long experience in precision-control. That is why you find Sandvik steels used for feeler gauges, watch springs, compressor valves, camera shutters, reeds, shock absorbers and many other exacting spring steel applications.

Sandvik supplies cold rolled specialty strip steels —

- **In special analyses for specific applications.**
- **Precision-rolled thicknesses to fit your requirements.**
- **In straight carbon and alloy grades.**
- **Annealed, unannealed or hardened and tempered — scaleless or polished bright, yellow or blue.**
- **With square, round or dressed edges.**

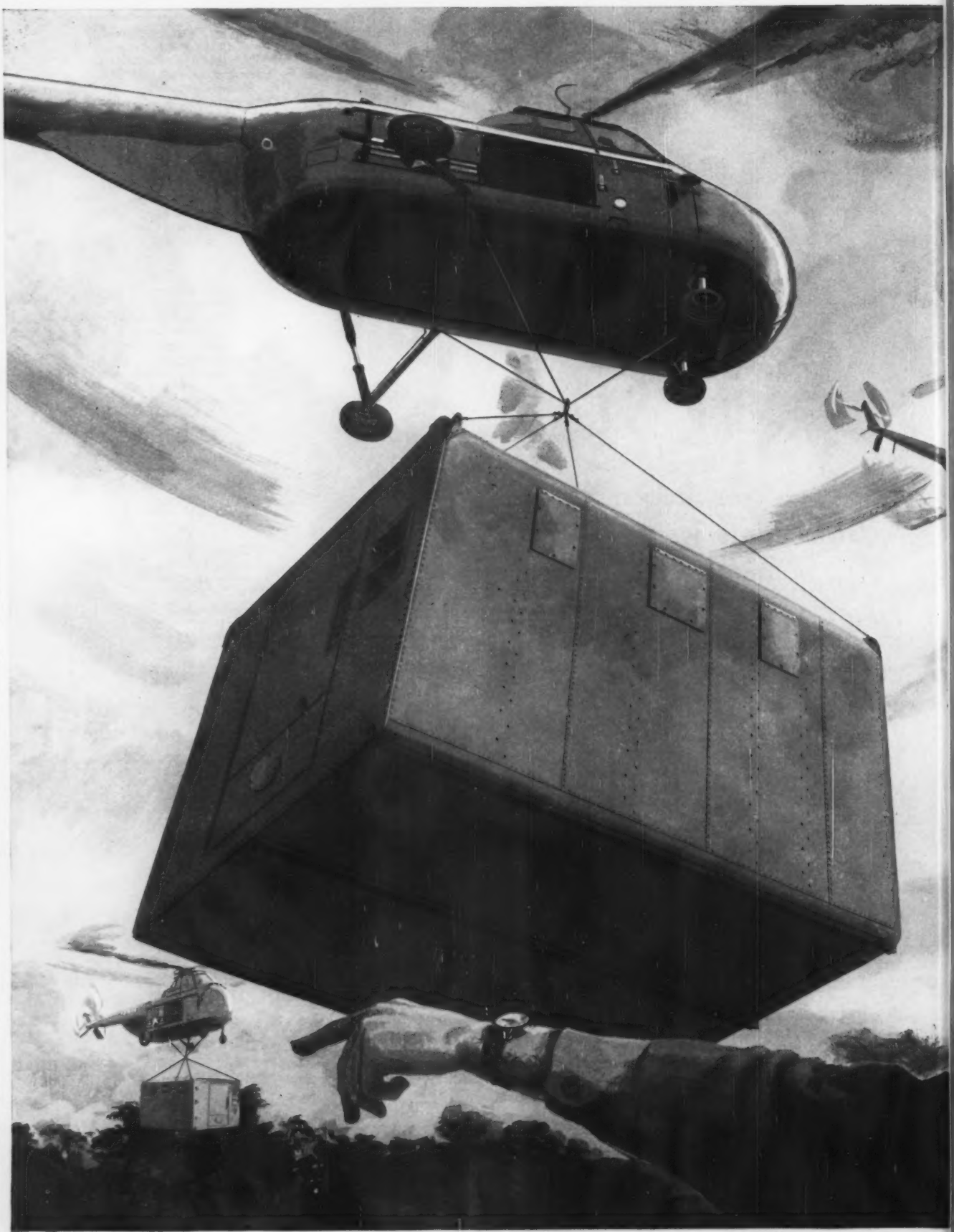
Sandvik stocks a wide variety of qualities and sizes. In addition Sandvik has Rolling, Slitting, Edge-Filing and Hardening and Tempering facilities.

NEW, FREE BROCHURE

Gives Specific Data On Sandvik Cold Rolled and Hardened and Tempered Strip Steels. Catalogs leading types by application and lists finish, usual size range and chemistry. Send for your copy today.

SANDVIK STEEL, INC.
1702 Nevins Road, Fair Lawn, New Jersey
Tel. SWarthmore 7-6200
In N. Y. C. ALgonquin 5-2200
Warehouses: Fair Lawn, N. J. • Cleveland • Los Angeles
Branch Offices: Cleveland • Detroit • Chicago • Los Angeles
SANDVIK CANADIAN LTD. P. O. Drawer 1335, Sta. O., Montreal 9, P. Q.
WORKS: Sandviken, Sweden

Sandvik Quality Steels



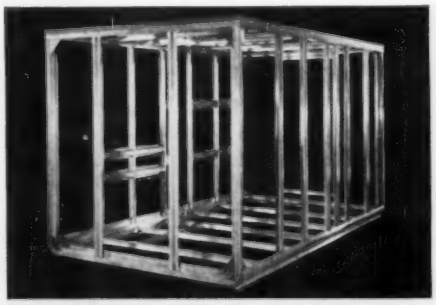
Tough, light Flynn extrusions frame "battle shelters" for electronic equipment

Drop them from helicopters. Bang them around in trucks. These "battle shelters" for electronic equipment are combat-ready. They're ribbed with tough, lightweight Flynn aluminum extrusions . . . for handling ease as well as ruggedness.

As a supplier for Gramm Trailer Corp. working for the U. S. Army, Flynn meets rigid standards. As in its work for other experts in our armed forces and industry, Flynn supplies quality extrusions formed to exact specifications.

Flynn will do the same for you. You can depend on Flynn for alloys and profiles of maximum strength and minimum weight. For strict adherence to specifications. For fast, as-promised deliveries. You can order large or small quantities in custom or stock profiles.

Plan, today, to investigate all the possibilities—all the advantages—of Flynn aluminum extrusions. Write, on your letterhead, for help, advice, and ideas. All free from Flynn, of course.



Flynn aluminum extrusions form the framework for Signal Corps Shelters made by Gramm Trailer Corp. After an aluminum skin is added, the finished "houses" for electronic equipment undergo drop tests. Designed in two different sizes, they can be carried by 2½ ton or ¾ ton trucks as well as by helicopter.

MICHAEL FLYNN MANUFACTURING COMPANY
Aluminum Division

Main Office & Plant:
700 East Godfrey Ave., Philadelphia 24, Pa. ..... Tel. FIdelity 2-5500

Sales Offices:
51 East 42nd Street, New York 17, N. Y. ..... Tel. YUkon 6-6020
937 Radcliffe Road, Towson, Md. ..... Tel. VAlley 3-2090
672 South Lafayette Park Place, Los Angeles 57, Calif. ..... Tel. DUnkirk 7-3183
4232 Herschel Street, Dallas 19, Texas ..... Tel. LAkeside 6-8757

FLYNN ALUMINUM

THIS IS

6583

THE IMAGE OF CF&I ...MAKER OF STEEL

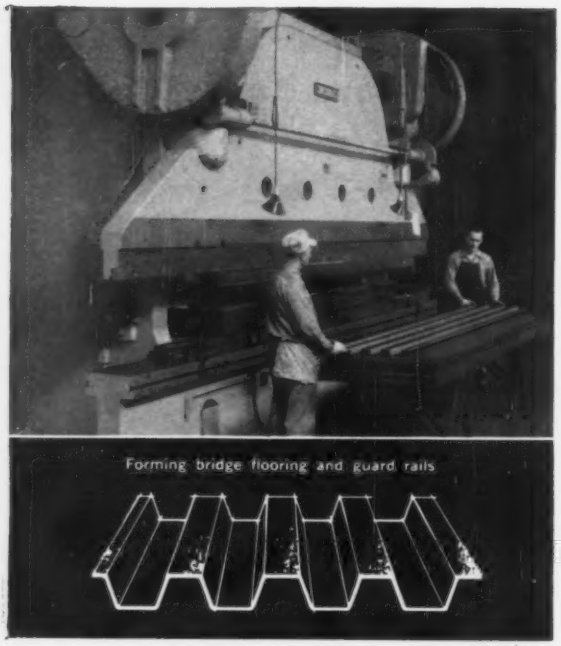
He's a giant steelman. He makes good steel and steel products for the diversified needs of today's economy. He anticipates tomorrow's requirements. He is constantly improving products through research and new manufacturing techniques.

His steel mills extend across the country. In them, he guards every step of manufacturing by rigid quality controls. And in his national network of offices and warehouses, he not only *sells* steel products, but he *serves* their users in every possible way.

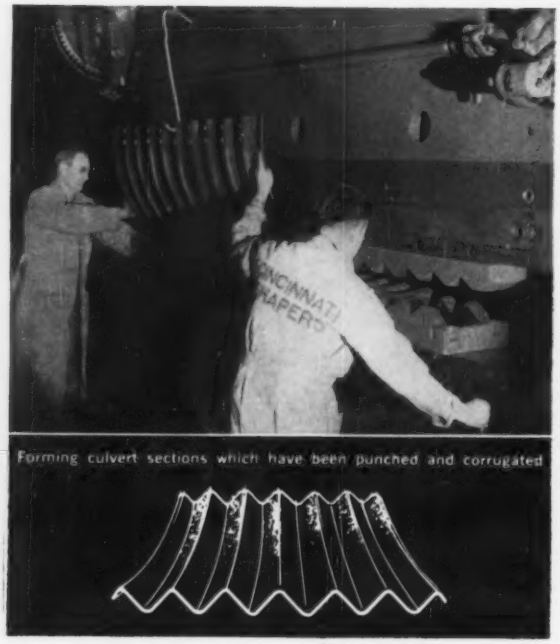
He is the dynamic image of CF&I . . . the symbol of dependable steel products. Look for him when you buy.

Plants at:
Pueblo, Colorado • Oakland and South San Francisco, California
Buffalo, New York • Claymont, Delaware • Palmer, Massachusetts
Birdsboro, Pennsylvania • Roebling, New Jersey • Trenton, New Jersey
40 Warehouses and 60 Sales offices located coast to coast

THE COLORADO FUEL AND IRON CORPORATION
DENVER • OAKLAND • NEW YORK

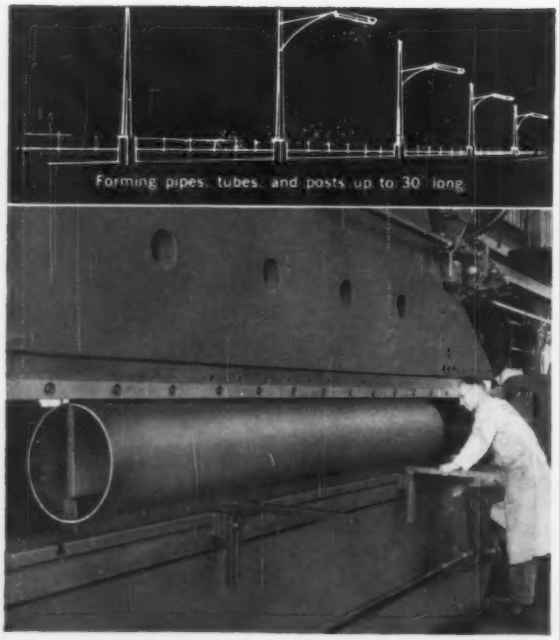


Forming bridge flooring and guard rails

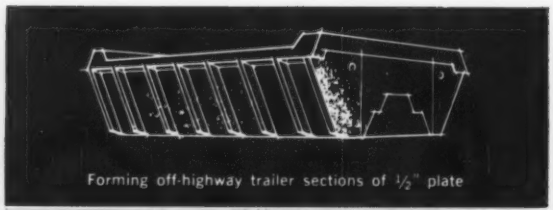


Forming culvert sections which have been punched and corrugated

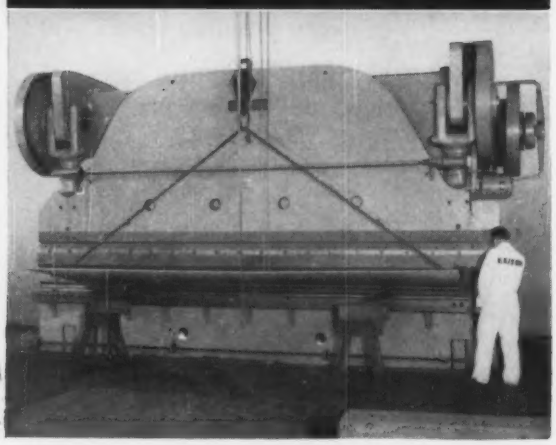
Tool up with Cincinnati® for

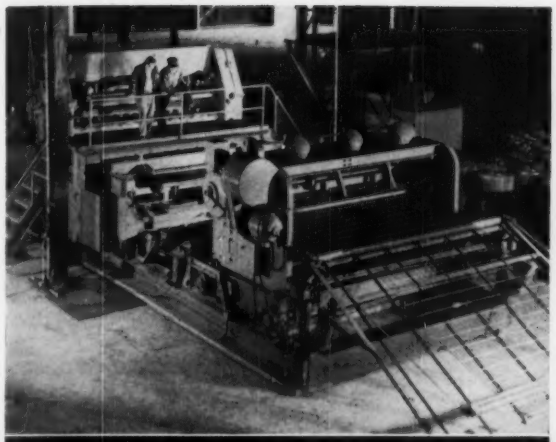


Forming pipes, tubes, and posts up to 30' long

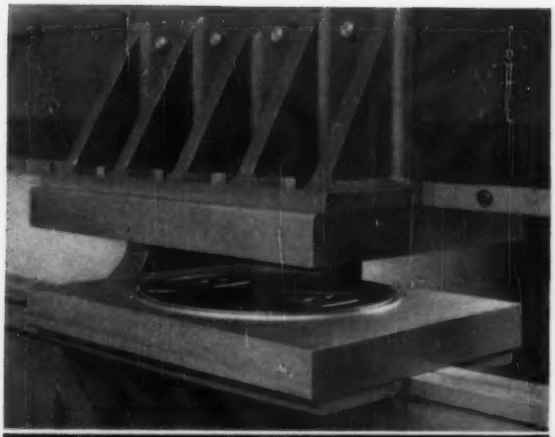


Forming off-highway trailer sections of ½" plate



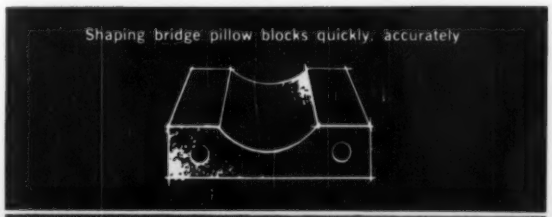


Automatically shearing welded steel road mesh

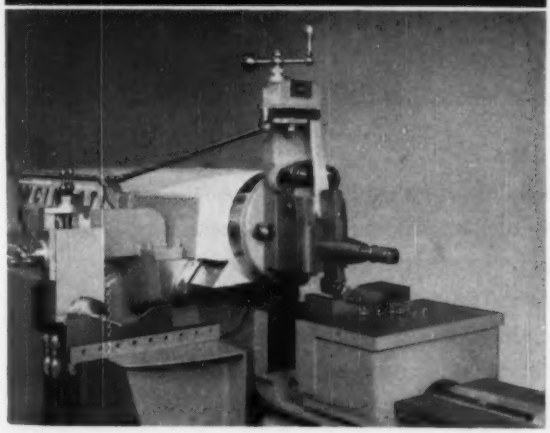


Embossing road signs

America's huge road program



Shaping bridge pillow blocks quickly, accurately



Here are just a few of the many jobs now being done profitably on Cincinnati® Shears, Press Brakes, and Shapers—helping to build America's highways.

Your share of the profits from this vast highway program will depend on your ability to supply metal components on time, in sufficient volume, to specifications, and at competitive prices. Whether you make guard rails or bridges, lampposts or culverts, curb forms or earthmovers—now is the time to measure your shear, press brake, and shaper capacity against the demand coming down the road.

Don't wait for competitive traffic. Write Department B for more data on these Cincinnati applications: Catalog B-5 on Press Brakes; Catalog S-7R on Shears; Catalog N-7 on Shapers.

Shapers / Shears / Press Brakes

THE CINCINNATI SHAPER CO.

Cincinnati 11, Ohio, U.S.A.

Eyes of the fleet

To search out the enemy task force, and act as a mobile early warning station. This is the mission of the Triton — the Navy's largest submarine and the newest atomic-powered member of the Silent Service.

Measuring 447 feet in length, the Triton, built by General Dynamics Corporation's Electric Boat Division, is officially known as a radar picket submarine.

The Triton carries with her two contributions from National Tube—National Seamless Pipe and Tubes in both carbon and stainless steels and National Seamless Steel Cylinders. National Seamless Steel Cylinders are used to house compressed oxygen and to store compressed air for torpedo firing.

This is another significant achievement for National

Tube. In almost every type of tubular installation aboard ship, from stem to stern, you'll find National Tube is more than qualified to handle your most difficult problems. Remember, for more than 80 years, National Tube has been a leader in the manufacture of tubular products for all types of building and industrial uses generally. For more information, write to National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

USS and National are registered trademarks

National Tube Division of USS United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
United States Steel Export Company, New York

CIMCOOL PRESENTS . . .

CIMPERIAL

Here is what we believe to be the most advanced, the most effective cutting fluid in the history of the industry.

CIMPERIAL is an entirely *new* chemical concentrate *especially designed for heavy duty applications.* It is the only water-miscible fluid capable of performing the tough, low clearance, low speed operations previously limited to cutting oils.

CIMPERIAL is a *chemical solution*—not an emulsion—which effectively covers 95% of all metal cutting jobs.

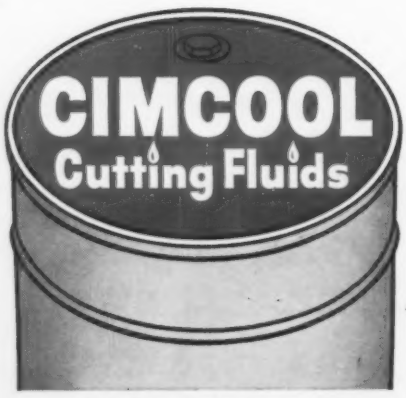
CIMPERIAL increases tool life because it defeats both heat and pressure. Forming a chemical solution in water, CIMPERIAL rapidly dissipates heat. Won't "hold" the heat as an oil will. CIMPERIAL contains newly discovered EP (Extreme Pressure) additives which give you more cutting action with less force. Result: *production equal to, or better than, oil; and working conditions vastly improved.*

Note these important advantages:

CIMPERIAL lasts longer. It won't turn rancid: it contains no food for bacteria and has a remarkable bactericide to control those bacteria that do enter the mix from outside sources. No more Monday morning odor. Less frequent coolant changes mean lower costs, less down time for machines.

CIMPERIAL is productive and clean. The *new* EP chemicals reduce the cutting forces and friction on the tool: in one case CIMPERIAL has already increased tool life 70%. It also has high film strength for lubricity characteristics better than oil. And there is no smoke or vapor around your machines.

CIMPERIAL controls rust. You get *two* types of chemical rust inhibitors in CIMPERIAL . . . which form both *polar* and *passivating* films over metal surfaces. This gives you, even at lean dilutions, double protection against corrosion.



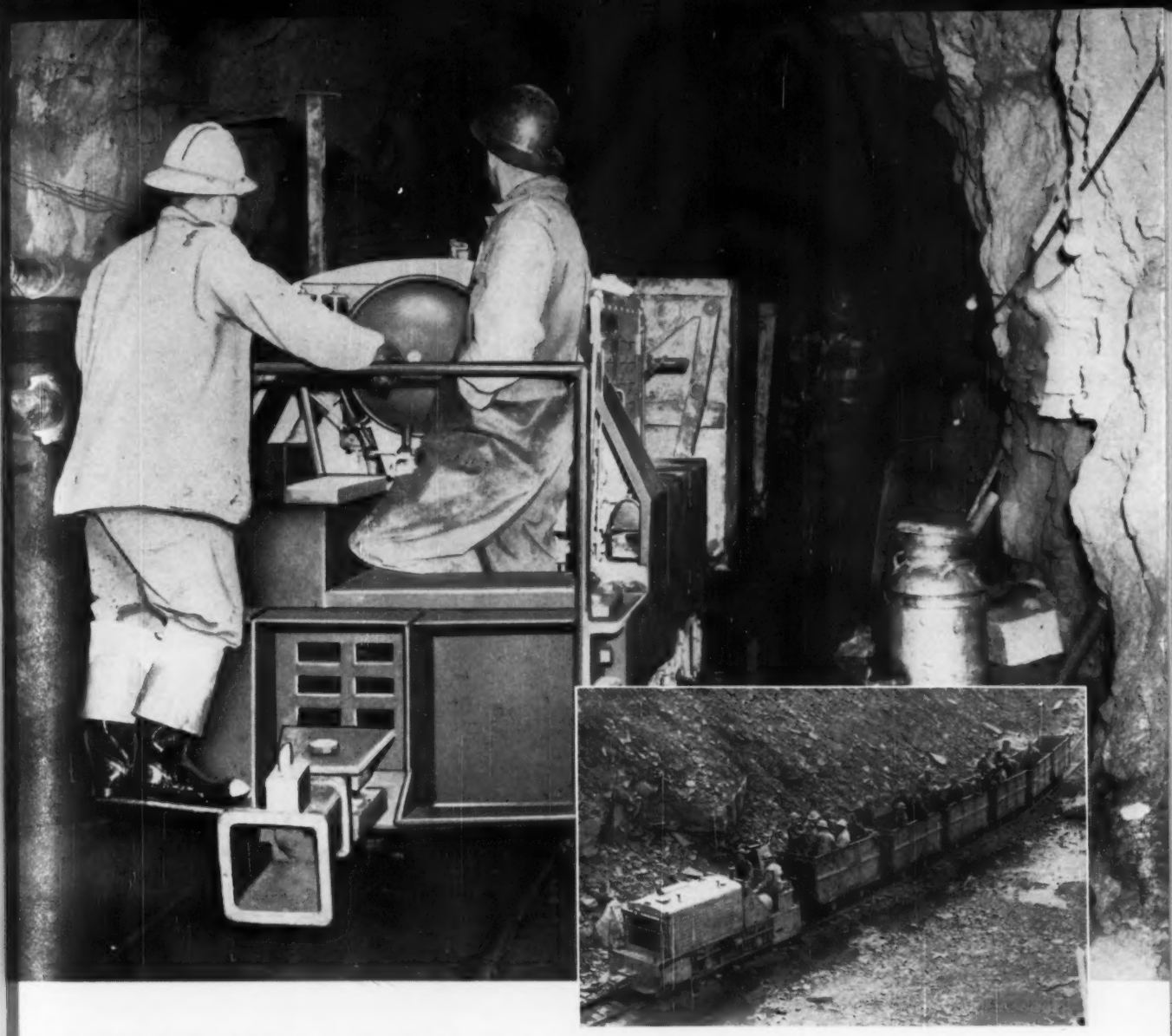
FOR 100% OF ALL METAL CUTTING JOBS

Production-proved products of The Cincinnati Milling Machine Co.

CIMPERIAL—*newest* in the famous, industry-proven line of CIMCOOL® Cutting Fluids!
CIMCOOL S2 Concentrate—The pink fluid which covers 85% of all metal cutting jobs.
CIMPLUS—The transparent grinding fluid which provides exceptional rust control.
CIMCUT Concentrates (AA, NC, SS)—For every job requiring an oil-base cutting fluid.
ALSO—CIMCOOL Tapping Compound—CIMCOOL Bactericide—CIMCOOL Machine Cleaner.

For full information on great new CIMPERIAL and the complete family of CIMCOOL Cutting Fluids, call your CIMCOOL Distributor today. Or contact Cincinnati Milling Products Division, Cincinnati 9, Ohio.

®Trade Mark Reg. U. S. Pat. Off.



PLYMOUTH Mine-O-Motives help set new records at West Delaware Tunnel

A fleet of 17 Plymouth Mine-O-Motives, employed by joint venture contractors Drake-Grafe-Winston-Tecon-Conduit under Project Manager Clancey O'Dell, have helped to establish new hard-rock tunneling records of as high as 85 feet per day on the West Delaware Tunnel near Cannonsville, New York. Working around the clock since the summer of 1956, these Diesel-powered mine locomotives have the most rugged service imaginable for mechanical equipment. Rough trackage, deep water, heavy loads of rock waste, all on a 24 hour schedule to push this 45 mile long tunnel deep through the Catskills for additional water to the New York City water system.

Used from the west portal and from several shafts on the western end of the tunnel, these 10 and 15 ton Diseel locomotives have proven their ruggedness and suitability for tunneling work. Plymouth exhause conditioning equipment has maintained tunnel air at a high degree of purity. Easy accessibility of all parts speeds maintenance, keeps down time to a minimum. Torque-converter drive cushions shock loads, speeds up production, provides maximum power, and reduces operator fatigue.

For full information on Plymouth Mine-O-Motives and Locomotives, tailored to your exact haulage needs, contact The Plymouth Locomotive Works, Division of The Fate-Root-Heath Company, Dept. A-2, Plymouth, Ohio.

RAIL POWER

PLYMOUTH® MINE-O-MOTIVES

WITH TORQOMOTIVE (Hydraulic Torque Converter) DRIVE

PLYMOUTH LOCOMOTIVES in Progressive Industry throughout the world

PROFITABLE PLUS: PERSONALIZED SERVICE

. . . part of Pennsalt's complete metal preparation service

Let Pennsalt engineers show you how to get best possible metal preparation at lowest cost. Our specialists survey your process, recommend chemicals to fit your needs, help supervise installation and start-up, and follow through with regular service calls to keep your finishing line running at its best. Our nationwide field organization gives you prompt attention, both on scheduled service and in emergencies.

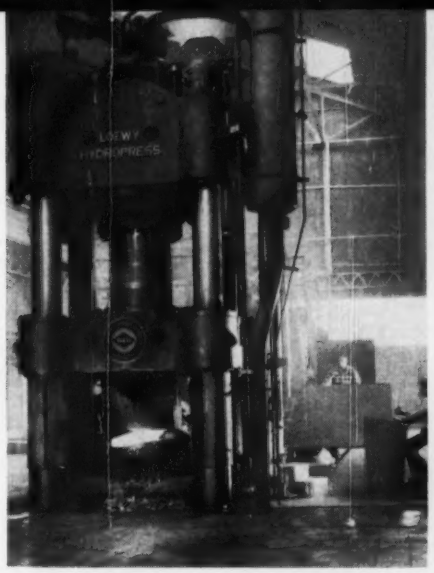
Pennsalt metal processing compounds—a complete line. You can be sure of the right chemicals for the best job at lowest cost, because Pennsalt makes every type of metal cleaner, phosphate coating and drawing compound you'll need. Abundant supply, too, because Pennsalt makes its own basic materials.

Pennsalt machinery . . . designed for savings. Pennsalt custom-engineers a complete line of automatic machines for cleaning, applying deep-draw lubrication, paint bonding, paint stripping and other finishing operations.

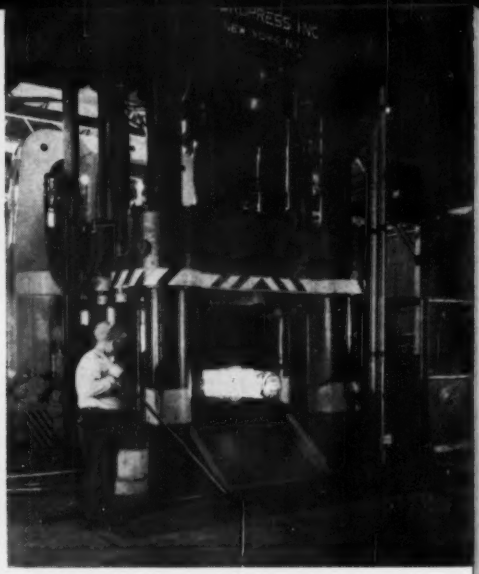
. . . a better start for your finish

Pennsalt Chemicals®
ESTABLISHED 1850

Call or write today for a consultation.
Metal Processing Department 700
PENNSALT CHEMICALS CORPORATION
Three Penn Center, Philadelphia 2, Pa.

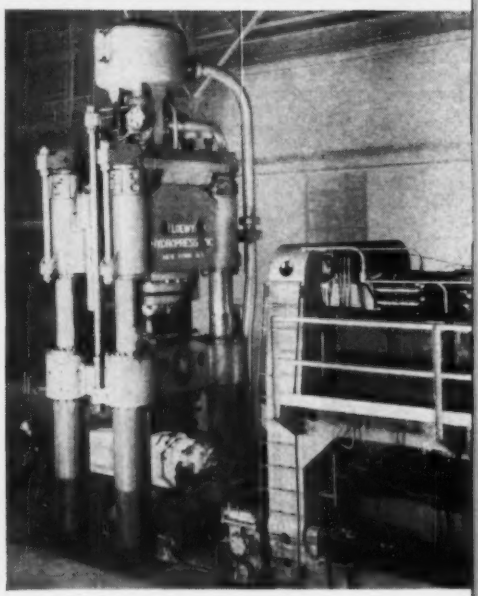


2000-ton press at Colonial Steel Division of Vanadium-Alloys Steel Co., Monaca, Pa. (left)



1500-ton press at leading alloy steel manufacturer in southern Pennsylvania.

2000-ton press at Simonds Saw & Steel Co., Lockport, N.Y. (left)



2000-ton press in operation at the Titusville, Pa., plant of Universal-Cyclops Steel Corp.

Why high-quality alloy steel makers are using Loewy fast-forging presses

The rapid advances in modern technology—especially in nucleonics, aviation and rocketry—call for production of the best in steels, free of segregation, clean and homogeneous, flawless and uniform in structure. Tests on high-quality steels produced on Loewy-Hydropress forging presses have yielded excellent results. America's leading mills find that Loewy forging presses enable them to meet the most exacting requirements of customers using steels for service conditions involving excessively high temperatures, stresses and corrosion.

Spontaneous statements by steel makers praise Loewy's "workmanship and fine talent," the trouble-free operation of Loewy forging presses, and the fact that these machines impart to special steels "internal qualities never before achieved." Again and again clients laud Loewy's continued and very real interest in their processes and operation, an interest which never ends with the installation of a press.

Loewy forging presses are designed for faster displacement of metal, fewer reheats, and minimum downtime. They outproduce hammers by a wide margin. Driven by air-loaded accumulators and equipped with oil-hydraulic servo controls, they assure smooth, safe, unfailing performance.

For particulars on how Loewy fast-forging presses can solve your production problems, write us at Dept. A-3.

Loewy-Hydropress Division

BALDWIN · LIMA · HAMILTON

111 FIFTH AVENUE, NEW YORK 3, N.Y. Rolling mills • Hydraulic machinery • Industrial engineering

BALDWIN BLH LIMA-HAMILTON

Burroughs' Unique Tests and Johnson Wire Build Quality, Long Life in Business Machines

Detroit Plant Develops Own Devices For 100% Tests of Music Wire Springs

Burroughs Corporation demands music spring wire as thin as a spider web's strand but with a minimum tensile strength of 439,000 pounds per square inch.

Then—to make sure it gets what it orders—the Detroit business machine manufacturer does 100 percent testing of all wire coming into its plants. Burroughs goes further than standard test equipment would permit and has developed its own special testing devices.

Burroughs' insistence on enforcing specifications is the kind of quality challenge on which Johnson Steel & Wire Company thrives. A customer's emphasis on quality wire complements Johnson's own skill and care given to producing the best in specialty fine wires.

Precision springs, made from Johnson Steel & Wire Company's music spring wire, get 100 percent testing on unique testing machines like this. Designed and built by Burroughs, this machine verifies a spring's load-carrying capacity at various extensions. If any modification is needed, correction can be made while spring is still on test device.

Johnson Steel & Wire has become Burroughs' major music spring wire supplier because Johnson's wire passes 100 percent inspection with flying colors.

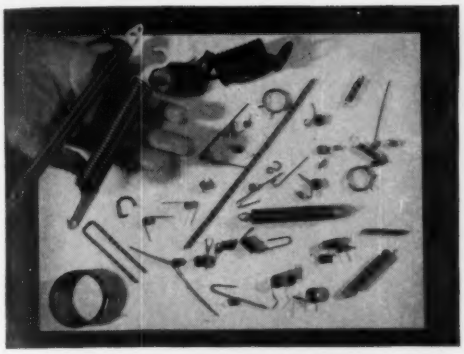
At Burroughs, where a monthly production of 3½ million precision springs of music wire is not unusual, close attention must be given to everything affecting performance of the finished spring. Failure of even the simplest spring could disable an adding machine, cash register, calculator or any of the dozens of different business machines Burroughs makes.

For its new machines, as well as service parts for older models, Burroughs makes 1,300 different kinds of springs. Music wire required for them ranges from .005-inches in diameter (with minimum tensile strength of 426,000 psi) to the largest diameter used—.106 inches in diameter, (with a minimum tensile of 268,000 psi).

Here's what Burroughs wants from music spring wire, in addition to tensile strength:

The coating, in the case of tin-coated music spring wire, must be uniform and adherent to eliminate peeling, cracking or flaking during coiling.

- **High physical qualities,** uniform cast and smooth, lustrous surfaces are another must so that uniform springs, within dimensions and capable of carrying assigned loads, can be produced.
- **Accuracy of dimensions** greatly affects spring coiling and spring performance. Burroughs' tolerance specifications are met consistently by Johnson's wire.
- **Straightness requirements** for pre-straightened wire call for a three-foot length of wire cut from a



Here's some of the approximately 1,300 different kinds of springs which Burroughs Corporation manufactures from Johnson Steel's music spring wire.

coil to be straight within 4 inches for .013-inch diameter wire and straight within 3 inches for wire .014-inch diameter and larger.

• **Coilability** is assured in the music spring wire Burroughs buys. Burroughs specifies that wire (.105 inch in diameter and smaller) must meet this test:

Wire is wound in a tightly closed spring to a coil length of 5 inches on an arbor 3 to 3½ times the diameter of the wire. When this spring is stretched so that it sets to 3 times its original length, the coils must show a uniform pitch with no splits or fractures in the wire.

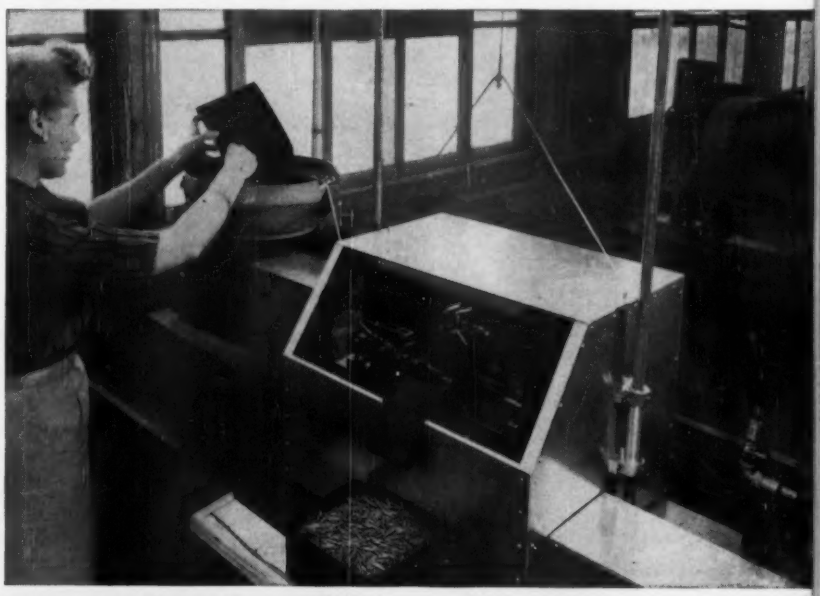
Testing completes the cycle which calls for highly skilled technicians coiling the best music spring wire available on the most modern equipment.

Testing machines, designed and built by Burroughs and used in addition to the standard machines, include the test fixture pictured here. This machine tests load-carrying capacity of springs. If any corrections are needed, they can be made while the spring is still on the test device.

Burroughs' careful attention to specs, its quality control and its testing procedure—plus its confidence in Johnson's music spring wire—are proof that Johnson can meet the toughest music wire demands.

Putting Johnson's music spring wire on your production lines starts benefiting you immediately. A corps of skilled wire engineers is as close as your telephone. Get in touch today with any of the district sales offices listed at right.

Several hundred music wire springs have been installed in this portable Burroughs adding machine. Every spring is critical, says Burroughs, because even the smallest spring failure could disable the machine.



This automatic spring eye-forming machine was designed and built by Burroughs personnel. An operator is shown filling the hopper with coiled springs which will be given an eye at each end on this device.

Johnson Steel & Wire Company, Inc.

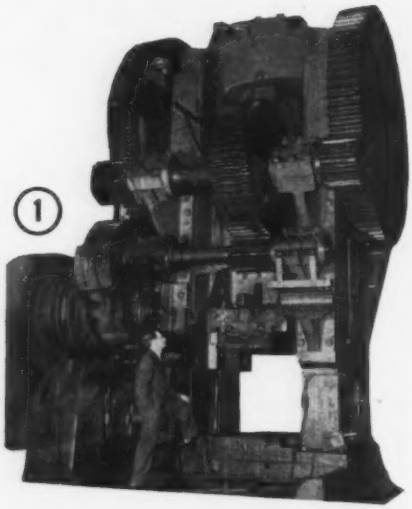
Worcester 1, Massachusetts

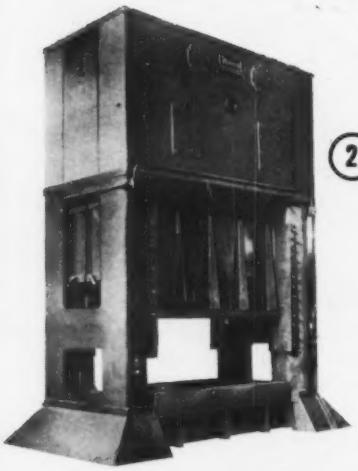
a subsidiary of **Pittsburgh Steel Company**

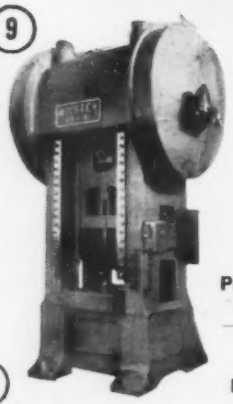
Grant Building • Pittsburgh 30, Pa.

DISTRICT SALES OFFICES

Atlanta	Cleveland	Detroit	Los Angeles	Pittsburgh
Chicago	Dayton	Houston	New York	Tulsa
			Philadelphia	Warren, Ohio







PRESSES LIQUIDATION

BELOW AUCTION PRICES!

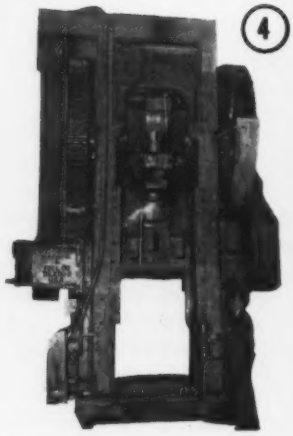
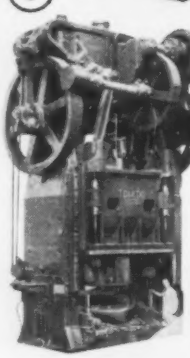
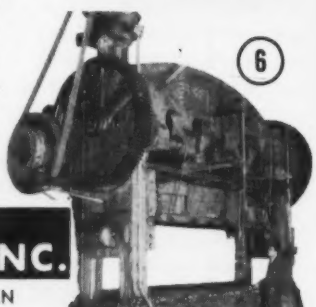


PHOTO NO.	TON. CAP.	MFGR.	MDL.	TYPE	BED AREA	STR.
1	1500	Toledo	81½	SSSC	72x53	24"
2	1000	*Warco	1000	2 PT	182x92	18"
None	800	Hamltn	4019	SSSC	54x41	16"
4	750	Toledo	59¾	SSSC	50x49	32"
5	700/390	Toledo	797 E	Dbl A	126x83	38/30"
None	580/390	Bliss	16	Dbl A	54x54	40/25"
6	525	Bliss	10 G	SSDC	167x48	20"
None	400	Toledo	96 F	SSDC	124x51	11"
7	325	Elmes	Hydr.	4 Pst	54x32	42"
8	300	Cleve	155 B	SSDC	60x42	6"
9	300	Minstr	40–8½	SSSC	48x37	16–24"
None	180	Bliss	7 D	SSDC	72x39	18"
None	161	Toledo	94 H	SSDC	96x48	12"

* Equipped with 60" coil cradle, roll feed, straightener & scrap cutter.

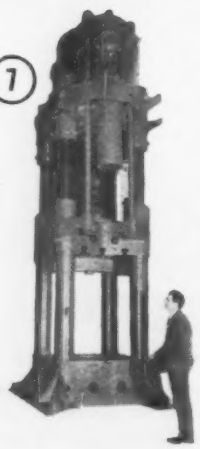




Successor to Montgomery Engineering Co.

Wender PRESSES INC.

11129 FRENCH ROAD, DETROIT 34, MICHIGAN
WAlnut 5-1170



MONEY-BACK GUARANTEE!

Get Our Low Prices on PRESSES designed to cut Costs on Your Job.
Clip this coupon to your letterhead and mail after filling in:

Type of Press required: .....

Bed area: ..... Stroke: ..... Tonnage: .....

Firm name .....

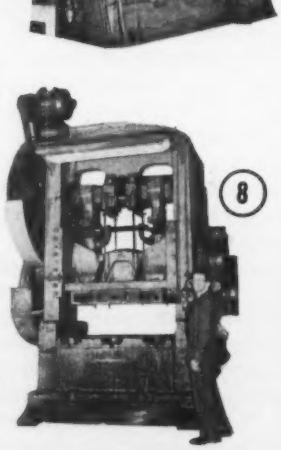
Address ..... City .....

State ..... Phone .....

Name: ..... Title .....

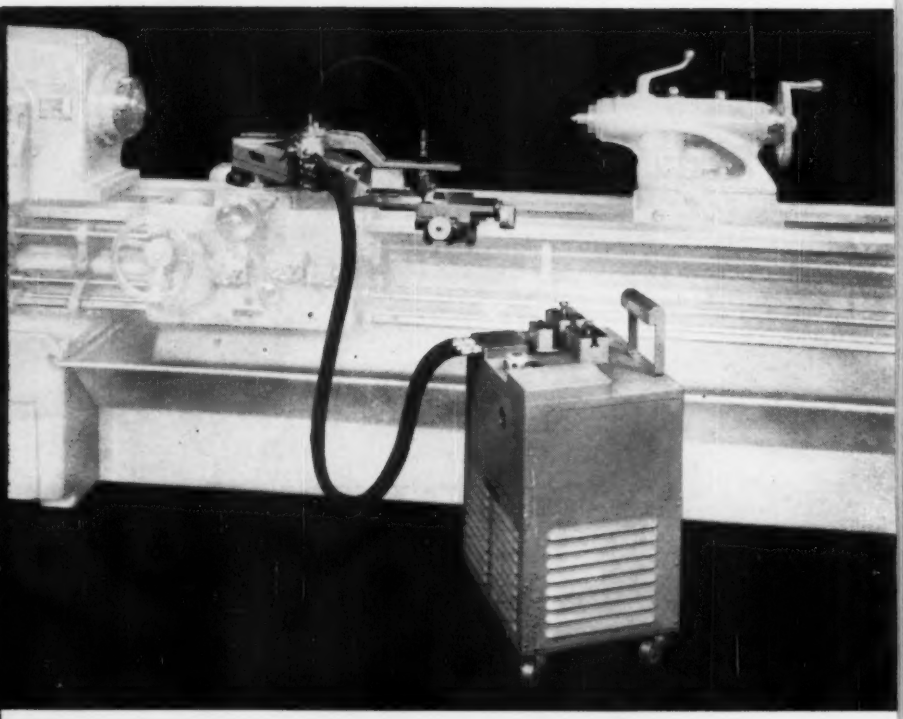
Today's date: ..... Date req'd: .....

Note: Please furnish minimum and maximum requirements in all cases



Don't Tool Up for Tomorrow's Boom with Yesterday's Lathes

MONARCH HIGH PRODUCTION LATHES OF TOMORROW



3.. The New Air-Tracer Pak... Portable Unit for Standard Monarchs in Your Plant

Here's a real turning technique breakthrough! The Air-Tracer Pak is just what the name implies—a portable, easily applied device for temporarily or permanently adding to many standard Monarchs in your shop *all the advantages of Air-Gage Tracer production.*

And what are those advantages? In a nutshell, this, the most accurate duplicating method in general use, always outproduces manual operation up to 8 to 10 times. It sizes automatically and, using only a single running tool, is ideal for *small lot repetitive work* without the need for expensive form tools or multiple tool setups.

Its accuracy of ± .001" on most work often cuts in half the stock left for grinding; sometimes eliminates grinding and polishing. It allows complete setup change in as little as 15 to 20 minutes and tool change in 1 minute. It is also the simplest, most trouble-free of all lathe duplicating units.

The photos show how the tracer slide assembly quickly replaces the regular compound rest on the cross slide. Note the template support and micrometer dials—the portable, completely self-contained power unit at the front of machine with air supply and electrical connections in the base.

Presto! it's on. And presto! it's off. Yet it's an adaptation of the time-tested swiveling Air-Gage Tracer with the versatility to handle the more complex turning, boring and facing jobs.

This is news! Write—or phone today—for the full story... The Monarch Machine Tool Company, Sidney, Ohio.

Monarch
TURNING MACHINES

IF IT CAN BE TURNED, THERE'S A MONARCH TO DO IT BETTER AND FASTER

1959

The DOUBLE IMPACT...

of a UDYLITE IDEA

Project Alert, as a philosophy of re-awakening, of renewed enthusiasm, of mental alertness, has shown wonderful results since its initiation last fall. Many organizations have asked us for supplies of Project Alert folders and buttons so that they may introduce it to their people. Leading magazines and newspapers, too, have given Project Alert splendid support.

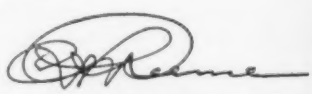
1. Project Alert, as a sound product promotion, has worked because each of the three product presentations has included a true specialized service, an economically sound value, and a new product.

Like the product presentations still to come, they are based entirely on *customer benefit*. Customer recognition of these values, measured by their response, has been excellent.

2. Adoption of the philosophy to your own organization will help you as surely as it has helped others. And keeping your eye on Udylite product presentations and their sincere true value offerings can only add to your profits.

If you want to adopt the Project Alert philosophy, we'll be glad to help you. And if you haven't seen our Project Alert product presentations, we'll furnish you copies on request.

Ask your Udylite sales representative, or write direct to us in Detroit



C. H. REEME,
president

the udylite corporation

detroit 11, michigan • world's largest plating supplier

Join the PROJECT ALERT CAMPAIGN now!

High-and mighty-stacker!

Lift, move and stack your king-size loads with a massive Gerlinger lift truck that takes weather, grades and rough terrain in its stride! Transporting 5 . . . 10 . . . 20 ton payloads in one man operations means *king-size savings* as well.

You'll get all the instant power, roadability and load stability you need, in *Gerlinger* lift trucks—literally "made to measure" for your specific handling operations. Ask for Towmotor-Gerlinger Certified Job Studies—and new Specification Folder GSS. Write Towmotor Corporation, Cleveland 10, Ohio or Gerlinger Carrier Co., Dallas, Oregon.

COME SEE US AT . . .
THE MATERIAL HANDLING INSTITUTE'S EXPOSITION
CLEVELAND AUDITORIUM
JUNE 9-12 1959
BOOTHS 1302-1307-1404

TOWMOTOR
THE ONE-MAN-GANG
®
-GERLINGER*

LEADERS FOR 40 YEARS IN BUILDING FORK LIFT TRUCKS, CARRIERS AND TRACTORS

*Gerlinger Carrier Co. is a subsidiary of Towmotor Corporation

production problem

Mass-production of modern "wonder alloys" might, in some respects, be compared with an attempt at assembly-line fabrication of Cellini's famed sculpture of "Perseus".

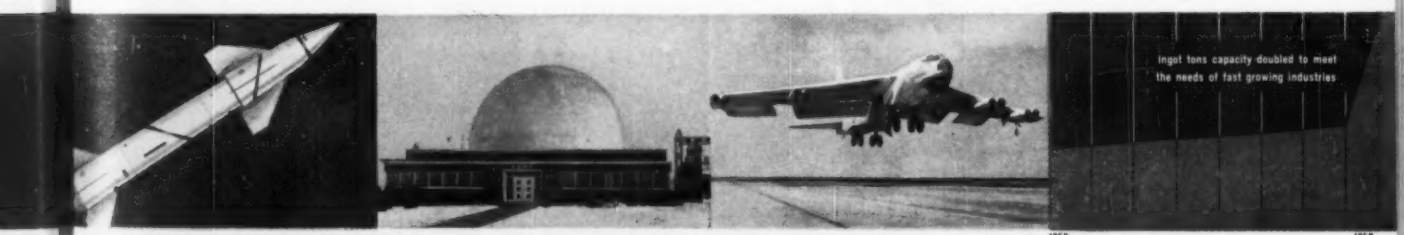
Both would require the careful precision, the intricate craftsmanship of experienced specialists, intimately familiar with ultra-modern production techniques.

Yet within the past year, high volume production of quality specialty steels has become a reality at *Carpenter. Ingot tonnage capacity*—the equipment and quality controls required to produce the world's finest steels—has *doubled almost overnight* through the acquisition of steelmaking facilities in Bridgeport, Connecticut.

For many years, demands by American industry for *Carpenter*-quality stainless, tool and alloy steels often exceeded our ability to produce. Like that of all custom-craftsmen, our objective was *quality,* the pioneering of new and better steels, rather than *quantity.*

Today, as the result of long-planned expansion, we can offer *quantity* along with famous *Carpenter quality.* For the first time, with our increased capacity, both quantity and quality are available. And both will continue to be available, even in times of peak demand.

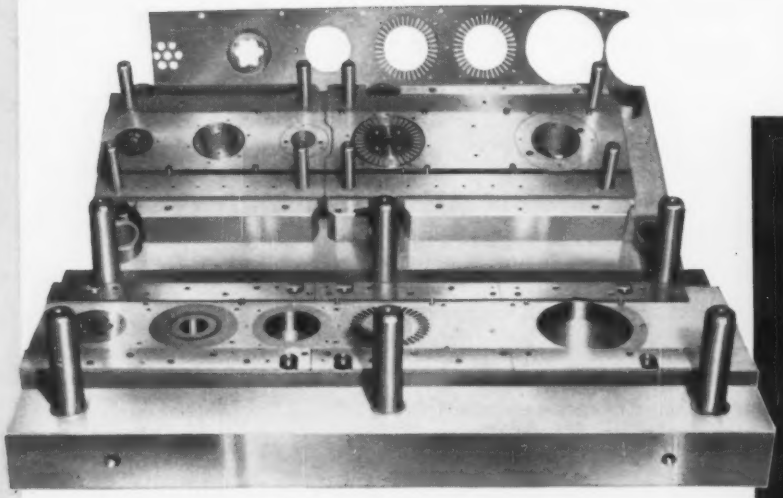
While *quality* will continue to remain a sacred *Carpenter* watchword, we are determined to lead the way and grow apace of the ever-increasing demands of industry for the world's finest specialty steels.



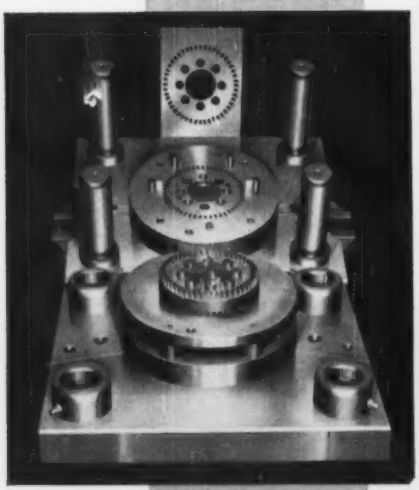
tool and die steels
stainless steels
electronic and magnetic alloys
special-purpose alloy steels
valve, heat-resisting and super alloy steels
tubing and pipe
fine wire specialties

Carpenter steel

The Carpenter Steel Company
Main Office and Mills, Reading, Pa.
Alloy Tube Division, Union, N. J.
Webb Wire Division, New Brunswick, N. J.
Carpenter Steel of New England, Inc., Bridgeport, Conn.



CARBIDE DIES

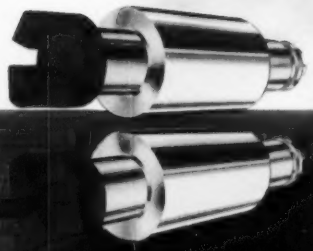


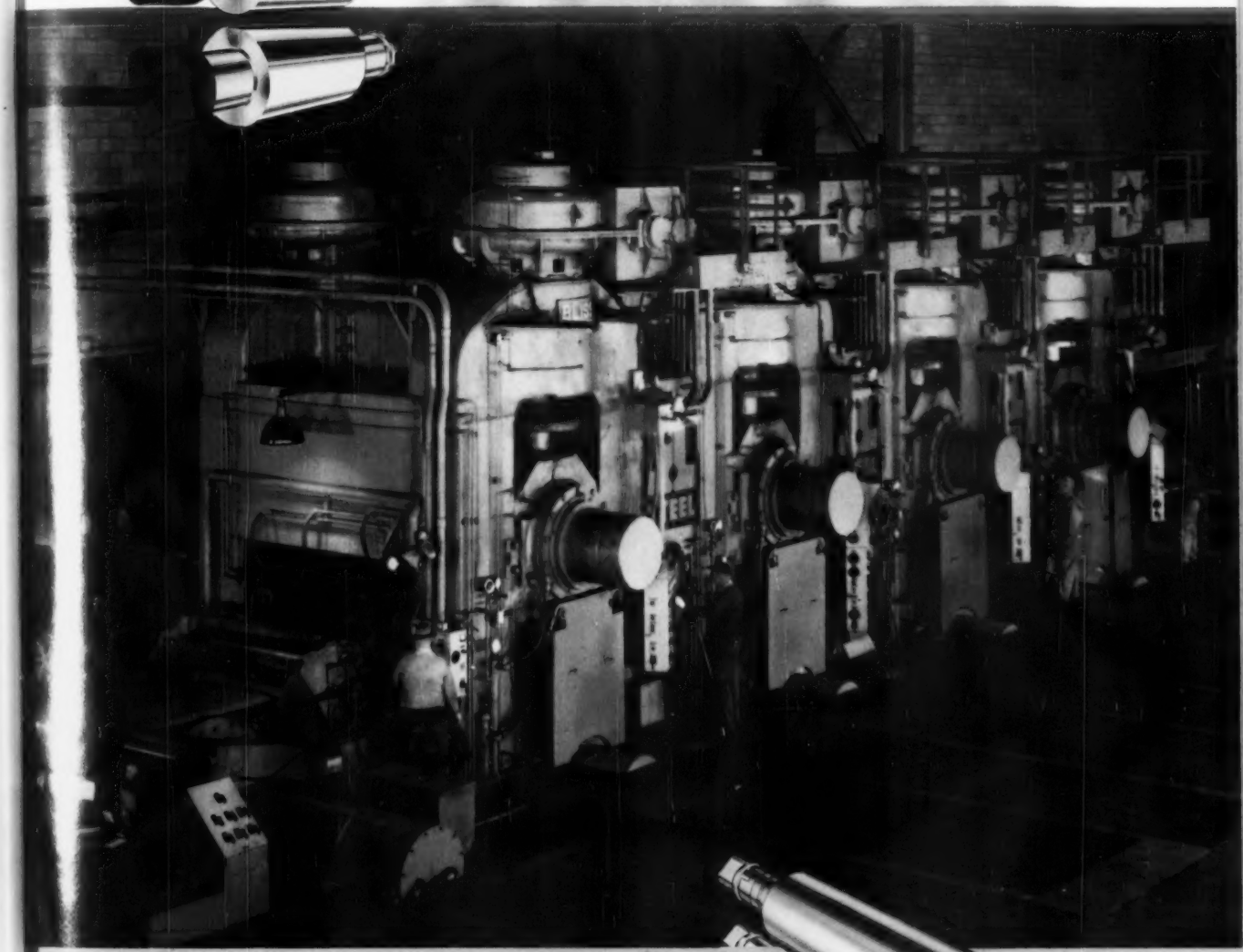
designed and built by

Lamina®
DIES AND TOOLS, INC.
P.O. BOX 31, ROYAL OAK, MICHIGAN

WE WOULD BE PLEASED TO QUOTE ON YOUR REQUIREMENTS

WHY THE WORLD'S MOST MODERN MILLS





USE MACK-HEMP ROLLS

PHOTO COURTESY JONES & LAUGHLIN STEEL CORPORATION

This new Bliss 4-stand cold reduction mill at Jones & Laughlin's Cleveland Works is the most modern of its kind in the world today. Naturally, Mack-Hemp rolls figure prominently in its roll inventory... just as they do everywhere metals are rolled. That's because Mack-Hemp's progressive metallurgical policy continues to pour forth a flow of new roll developments unmatched in the industry, just as it has over the past 135 years. Today, the rolls with the striped red wabblers give you greater tonnages than ever before.

MACKINTOSH-HEMPHILL • Division of E. W. BLISS COMPANY

Pittsburgh and Midland, Pa.

MACKINTOSH-HEMPHILL DIVISION · PITTSBURGH · U.S.A.

BLISS

Profit by UDDEHOLM'S Complete Service In Precision Ground Tool Steel

Two new Uddeholm features—features that continue their benefits *after* delivery—now add further convenience to your use of Precision Ground Tool Steel.

Rust-Preventive Envelopes Each piece of Uddeholm Ground Flat Stock is now wrapped individually in corrosion-inhibiting VPI paper. You can use these envelopes to store degreased steel indefinitely without danger of rust.

Special Marking Quick, sure identification of unwrapped steel is now assured by several electro-etch markings on each piece.

And don't overlook these other important reasons why Uddeholm continues to be your most reliable source for Precision Ground Tool Steel: A tremendous selection of available sizes to meet your needs more closely—Choice of oil-hardening UHB-46 (SAE O1) or air-hardening UHB-151 (SAE A2)—A world-wide reputation of tool steel quality, guaranteeing you the finest performance possible—Ample warehouse stocks and fast service to get your *complete* order to you without delay.

Write for this handy, 8½" x 11" stock size chart of Uddeholm Precision Ground Tool Steels

UHB

UDDEHOLM COMPANY OF AMERICA, INC.

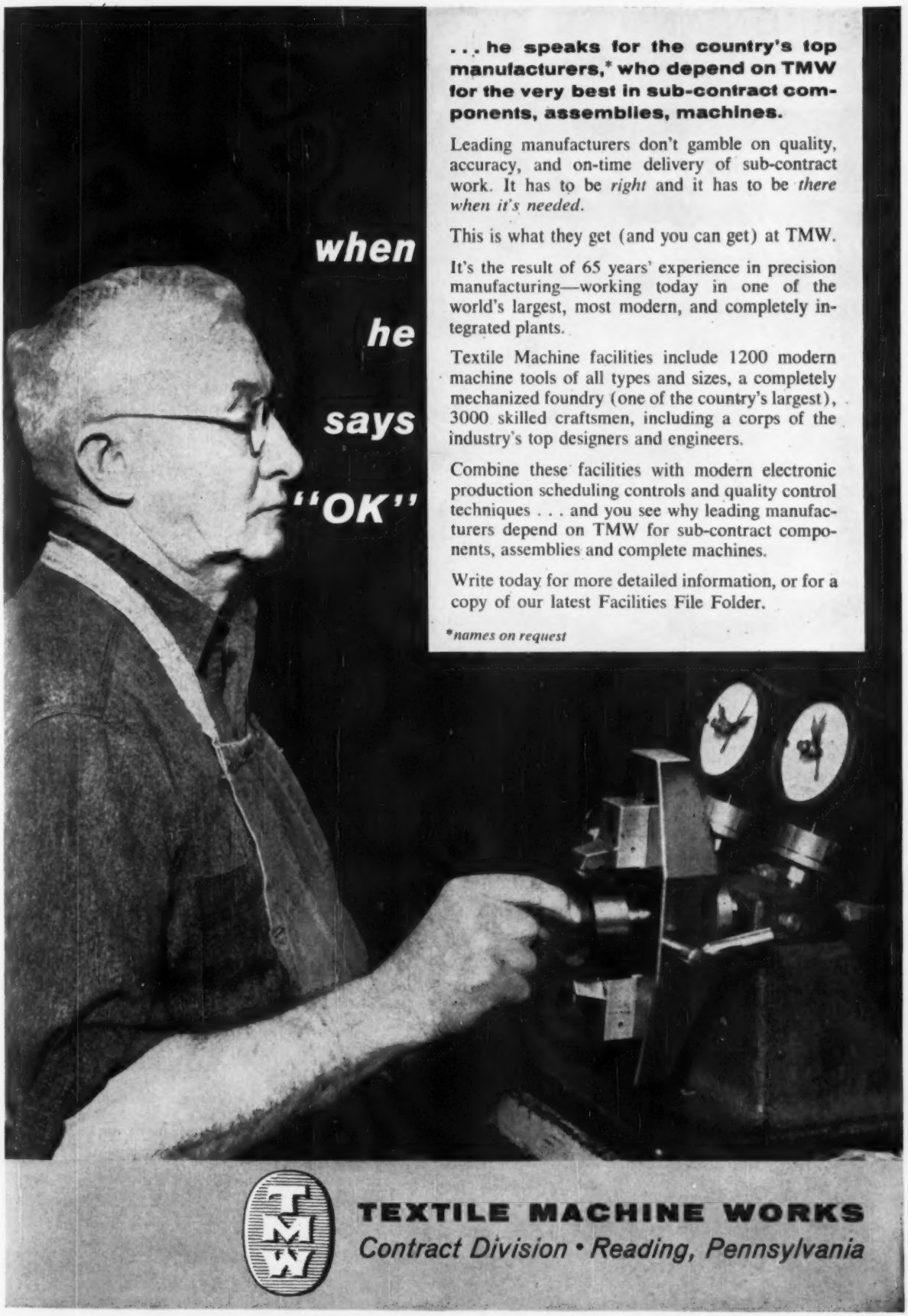
Tool and Die Steels
Cold Rolled Spring Steels

Offices and Warehouses

New York: 155 East 44th Street, MUrray Hill 7-4575
Cleveland: 4540 East 71st Street, Dlamond 1-1110
Los Angeles: 5037 Telegraph Road, ANgelus 2-5121

District Representatives

CHICAGO: Frank J. Mackin, Leroy E. Marshall, 55 East Washington, STate 2-1649
DETROIT: Warren H. Nugent, 17304 Lahser Road, KEnwood 5-6340
PHILADELPHIA: Frank T. Campagna, 1418 Walnut St., PEnnypacker 5-2114
PITTSBURGH: Lohmeyer Steel Co. 345 Mount Lebanon Blvd., LOcust 3-0122



. . . he speaks for the country's top manufacturers,* who depend on TMW for the very best in sub-contract components, assemblies, machines.

Leading manufacturers don't gamble on quality, accuracy, and on-time delivery of sub-contract work. It has to be *right* and it has to be *there when it's needed.*

This is what they get (and you can get) at TMW.

It's the result of 65 years' experience in precision manufacturing—working today in one of the world's largest, most modern, and completely integrated plants.

Textile Machine facilities include 1200 modern machine tools of all types and sizes, a completely mechanized foundry (one of the country's largest), 3000 skilled craftsmen, including a corps of the industry's top designers and engineers.

Combine these facilities with modern electronic production scheduling controls and quality control techniques . . . and you see why leading manufacturers depend on TMW for sub-contract components, assemblies and complete machines.

Write today for more detailed information, or for a copy of our latest Facilities File Folder.

**names on request*

TEXTILE MACHINE WORKS

Contract Division • Reading, Pennsylvania

CARBON AND ALLOY STEEL INVENTORIES...

They can and will—if you let *Frasse* stocks be your inventory! Your cost for steel ready for use will be less. You'll save the cost of labor, handling, processing and obsolescence...free plant space and idle capital for profitable use. You incur no expense until material is needed...then only the cost of steel—*not* the purchase price PLUS the *high cost of possession.*

With Frasse stocks as your inventory, you can pick from 20 different grades—any one of 2001 sizes. For, Frasse carries a complete range of carbon bars and shafting as well as commercial and aircraft quality alloys. There's always a size and grade for any application...*immediately available.*

Weigh the advantages of this modern solution to steel inventory problems. You get broad selection, fast deliveries—and the help of specialists that offer a wealth of technical information and problem-solving techniques. Place future orders for the carbon and alloy bars you need with Frasse—*your* Steel Service Center. You'll find it convenient...and far more economical than maintaining your own inventory.

Call FRASSE 1st for

COMPLETE

CARBON AND ALLOY STEEL SERVICE

Frasse Carbon and Alloy Stocks Include:

C1018	C1137	E9310
C1045	C1212	E4130
B1112	C1213	4140
B1113	Ledloy	4142
B1113X	4615	E4340
C1117	8620	E8740

4140 H.T. • 4142 H.T.

Precision Shafting • Special Finish
Turned & Polished Shafting • Drill Rod
4130 Aircraft Quality Sheets

AMERICAN STEEL WAREHOUSE ASS'N
YOUR STEEL SERVICE CENTER

Peter A. Frasse & Co., Inc.

New York 13, N.Y.	Philadelphia 29, Pa.	Buffalo 7, N.Y.	Syracuse 1, N.Y.	Hartford 1, Conn.
17 Grand St.	3911 Wissahickon Ave.	P.O. Box K, Sta. B	P.O. Box 1267	P.O. Box 1949
WAlker 5-2200	BAldwin 9-9900	BEdford 4700	HOward 3-8655	JAckson 9-6861

Anodized grille of Penmetal Multimesh blends elegance with strength

Color and texture are excitingly combined in this golden grille of Penmetal expanded aluminum. The new patented Multimesh pattern has depth and variety. Gives, in fact, an air of elegance to the handsome "hi-fi."

Penmetal expanded metal has the strength to withstand the abuse of everyday use; the rigidity to span large areas in an unbroken sweep. What's more, the open mesh permits free passage of sound. The color is an integral part of the metal surface . . . for permanent brightness.

Get one-of-a-kind beauty for *your* product with any of the new Multimesh patterns: Crystal, Pendant, Garland.* Easy to work with. Easy on your pocketbook.

Folder 516-EM gives sizes and dimensions of Multimesh. Write for a FREE copy today.

PENN METAL COMPANY, INC.

General Sales Office:
40 Central Street, Boston 9, Mass.

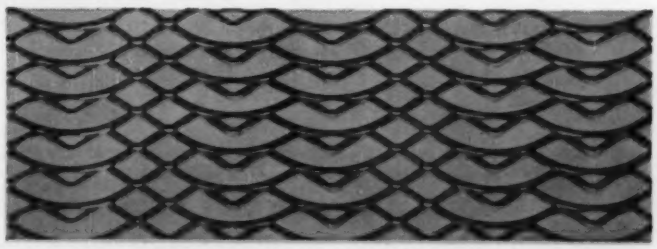
Plant: Parkersburg, W. Va.

District Sales Offices: Boston, New York, Philadelphia, Pittsburgh, Chicago, Detroit, Dallas, Little Rock, Seattle, San Francisco, Los Angeles, Parkersburg

Penmetal

a name to remember

"Stereotron" stereophonic unit by Griffith Company, Parkersburg, W. Va., features a gold anodized grille of Penmetal's Pendant Multimesh.



*All designs are patented.

PM-199

In the vacuum-pourer shown above, the melt is poured into a low-pressure atmosphere in which the molten stream is dispersed—releasing undesirable gases and other substances.

Special alloys, low hydrogen content steels, finished products—available on short notice from Standard

Even in the face of today's extremely critical requirements in metallurgy, Standard Steel Works has maintained its great reputation for quality and service.

With our electric furnace—and the new vacuum-pouring degasser recently placed in operation—we at Standard have facilities in keeping with industry's demands for steel in all applications.

Samples of vacuum-poured steel are tested for gas content in the analytical laboratory apparatus shown above.

Standard Steel Works Division

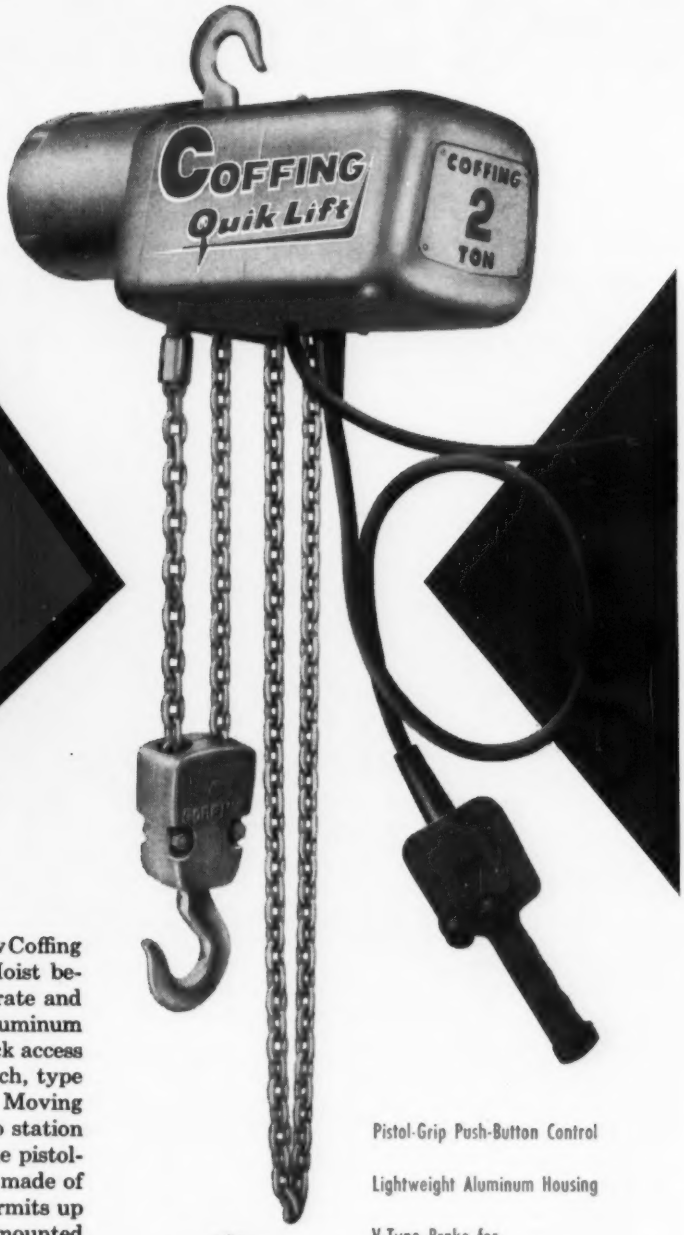
BALDWIN · LIMA · HAMILTON

BURNHAM, PENNSYLVANIA

Rings • Shafts • Car wheels • Gear blanks • Flanges • Special shapes

COFFING Quik Lift Electric Hoist

20 Models in Capacities from 1/4 to 2 tons



Workmen like the new Coffing Quik-Lift Electric Hoist because it is easy to operate and light to handle. The aluminum housing is in sections for quick access to change voltages, limit switch, type of suspension or chain. Moving the Quik-Lift from station to station in your plant is simple and fast. The pistol-grip push-button control station is made of non-conducting plastic. Its design permits up or down operation while pulling trolley mounted hoists. Power to the controls is reduced to 115 volts for added safety. For new hoist efficiency specify Coffing Quik-Lift. Your Coffing distributor has them in stock and will give you complete details, or write for Bulletin ADH-65.

DUFF-NORTON

- Pistol-Grip Push-Button Control
- Lightweight Aluminum Housing
- V-Type Brake for Maximum Braking Surface
- Easily Adjusted Limit Switch
- Complete Line of Accessories

RATCHET LEVER HOISTS

SAFETY HOOKS

CHAIN HOISTS

COFFING HOIST

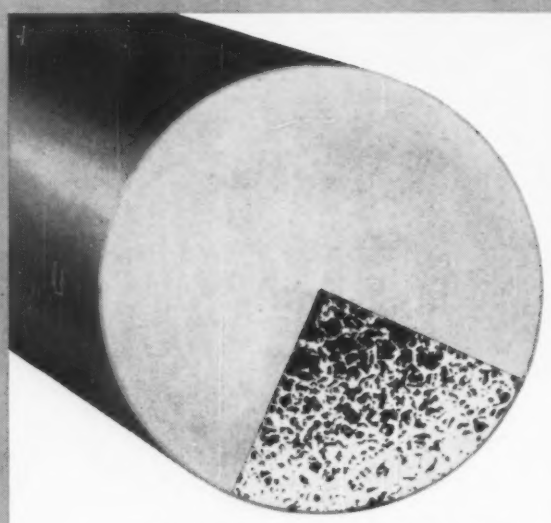
DIVISION OF

DUFF-NORTON COMPANY

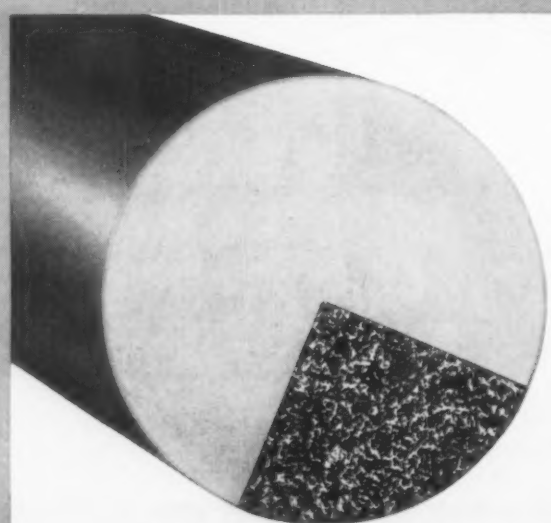
814 Walter Street • Danville, Illinois

Republic Cold Drawn Carbon Corrected Bars

REDUCE YOUR COSTS 3 WAYS!



Photomicrograph showing decarb to a depth of .020" in the surface of hot rolled bar of C,1050 steel—magnified 100 times.



Here is the same bar after carbon correction annealing. Note the restoration of carbon on the outer surface, also the refinement of grain structure.

1. You save both metal and money by eliminating waste. Republic Carbon Corrected Bars eliminate the extra preparation of machining or grinding away the surface of the bars to remove decarb.
2. You eliminate the need for buying bars oversize to allow for decarb removal to depths of 20 thousandths of an inch or more.
3. You get better MACHINABILITY.

Carbon correction is the restoration of all the carbon lost from the bar surface through decarburization during hot rolling. The lost carbon is restored right out to the surface of the bar by annealing in a controlled carbon-rich atmosphere prior to cold drawing.

Another advantage of this process is the resulting refinement of grain structure as indicated in the photomicrographs.

Carbon Corrected Bars are ideally suited for your steel parts calling for high surface hardness—particularly those produced by high frequency induction heating.

To the advantages of carbon correction add the improved machinability produced by the cold drawing process. You can eliminate finishing operations by taking advantage of the full diameter of Republic Cold Finished Steel Bars. You can boost feeds and speeds with no sacrifice of tool life or finished surface quality. You can secure better product performance through the higher ultimate strength, yield point, and hardness of cold drawn steel.

Republic metallurgists and machining specialists are available to help you use Republic Cold Drawn Carbon Corrected Bars to best advantage. They are ready to help you raise production efficiency, lower unit cost, obtain better machinability. No obligation. Just mail the coupon.

REASONABLE COST, GREAT STRENGTH, AND PRECISE TOLERANCE are requirements met by Republic Cold Finished Alloy Steel Bars in the production of sucker rod couplings. The parts must also withstand enormous static and dynamic loads, to more than 40,000 psi. Alloy steels provide an outstanding combination of qualities essential to designing smaller sections to carry heavier loads safely. By adding the advantages of the cold finishing process, you have a material that offers strength, hardness, machinability, size, and cross-sectional accuracy, smooth bright surface, and close tolerance straightness. Send coupon for more information.

REDUCE COSTS, IMPROVE QUALITY, INCREASE PRODUCTION with Republic Cold Drawn Special Sections. Formed to the predominating cross-section of the part to be produced, special sections eliminate or greatly reduce required machining. Results are faster output and lower cost. Also, since cold drawing improves the physical properties of any given analysis, completed parts are stronger and longer wearing. Other advantages may include improved performance and simplified design. Send coupon for full facts.

MACHINABILITY, SUPERIOR STRENGTH, AND CORROSION-RESISTANCE are reasons for the use of Republic Cold Finished Stainless Steel Bars in parts such as outboard motor drive and propeller shafts. Republic's cold finished, free-machining stainless steel bars offer close tolerance, accuracy of section, uniform soundness, and fine surface finish. Two grades, A.I.S.I. Types 416 and 430-F are fully 90% as machinable as Bessemer screw stock. Republic also supplies ENDURO® Stainless Steel in hot rolled bars, special sections, and wire. For more facts, mail the coupon.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

REPUBLIC STEEL CORPORATION
DEPT. IA -7486
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

Please send more information on:

☐ Carbon Corrected Bars
☐ Cold Finished Alloy Steel Bars
☐ Special Sections
☐ Cold Finished Stainless Steel Bars

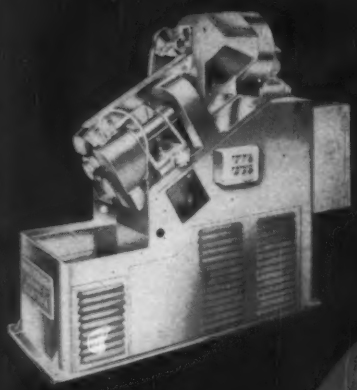
Name_____ Title_____

Company_____

Address_____

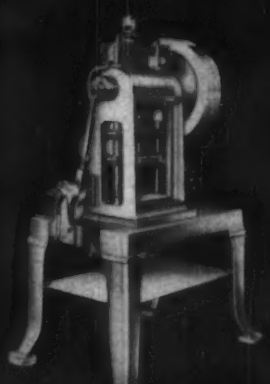
City_____ Zone____ State_____

COLD HEADING
MACHINERY

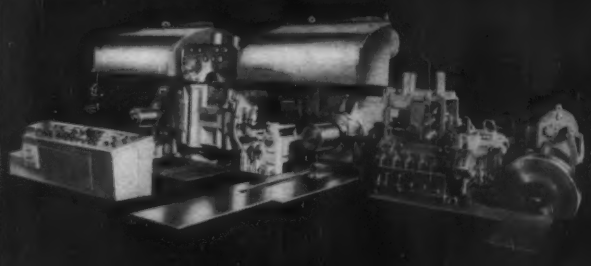


EYELET, SLITTER
& WIRE
MACHINERY

WATERBURY FARREL
MACHINERY BUILDERS



ROLLING MILL
MACHINERY



POWER
PRESSES

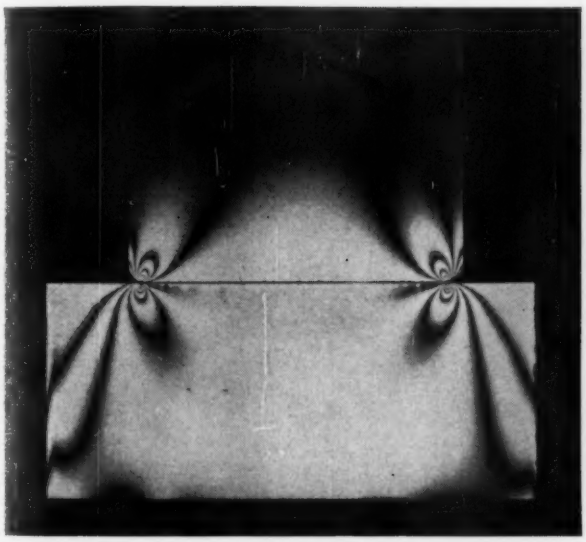
THE WATERBURY FARREL FOUNDRY & MACHINE CO.
DIVISION OF TEXTRON INC.
Waterbury, Connecticut • U.S.A.
Sales Offices: Chicago • Cleveland • Los Angeles • Millburn, N. J.

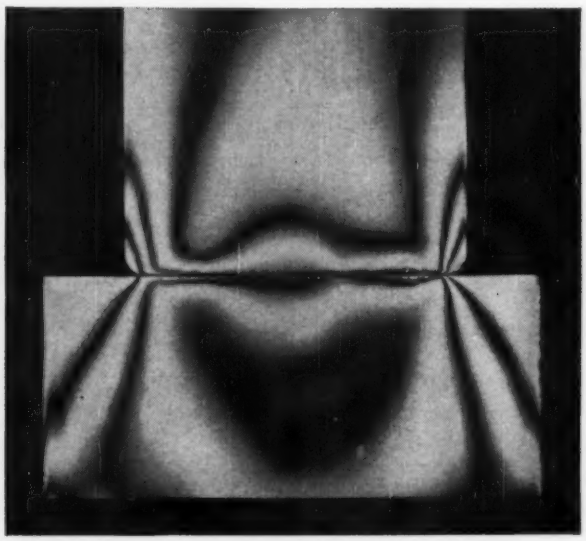
WF-56

One in a series of technical reports by Bower

BEARING BRIEFINGS

ROLLER BEARING LIFE AND CAPACITY LINKED TO STRESS DISTRIBUTION





These reproductions of photoelastic studies contain important evidence for every engineer and designer concerned with the performance and selection of roller bearings. In these photographs, the alternate dark and light areas, called fringes, indicate not only the magnitude of stress but also the stress distribution. The photographs were taken by Bower Research Engineers during a study of stress distribution in roller bearings.

The subjects represent rollers and raceways of two roller bearings under identical loads. The illustration at the left shows a roller of conventional design. The illustration at the right shows a Bower "Profiled" roller. That is, the roller is precision ground with a large radius generated along the body of the roller—a predetermined and controlled distance from each end.

The conventional roller photo (left) clearly shows how, under load, stress concentration builds up in and near the roller ends. This is called edge-loading. Such areas of concentrated stress are the breeding grounds for metal fatigue and eventual bearing failure.

In the photo of the "Profiled" roller (right) stress lines can be seen uniformly distributed across the whole length of the roller and raceway. There are no points of excessive stress concentration, consequently no starting points for early fatigue. Such a "Profiled" roller exhibits a great advantage in improved load carrying capacity, a most important bearing requirement.

Under actual operating conditions, Bower "Profiled" roller bearings show a considerably longer life at higher speeds and under greater loads than conventional roller bearings.

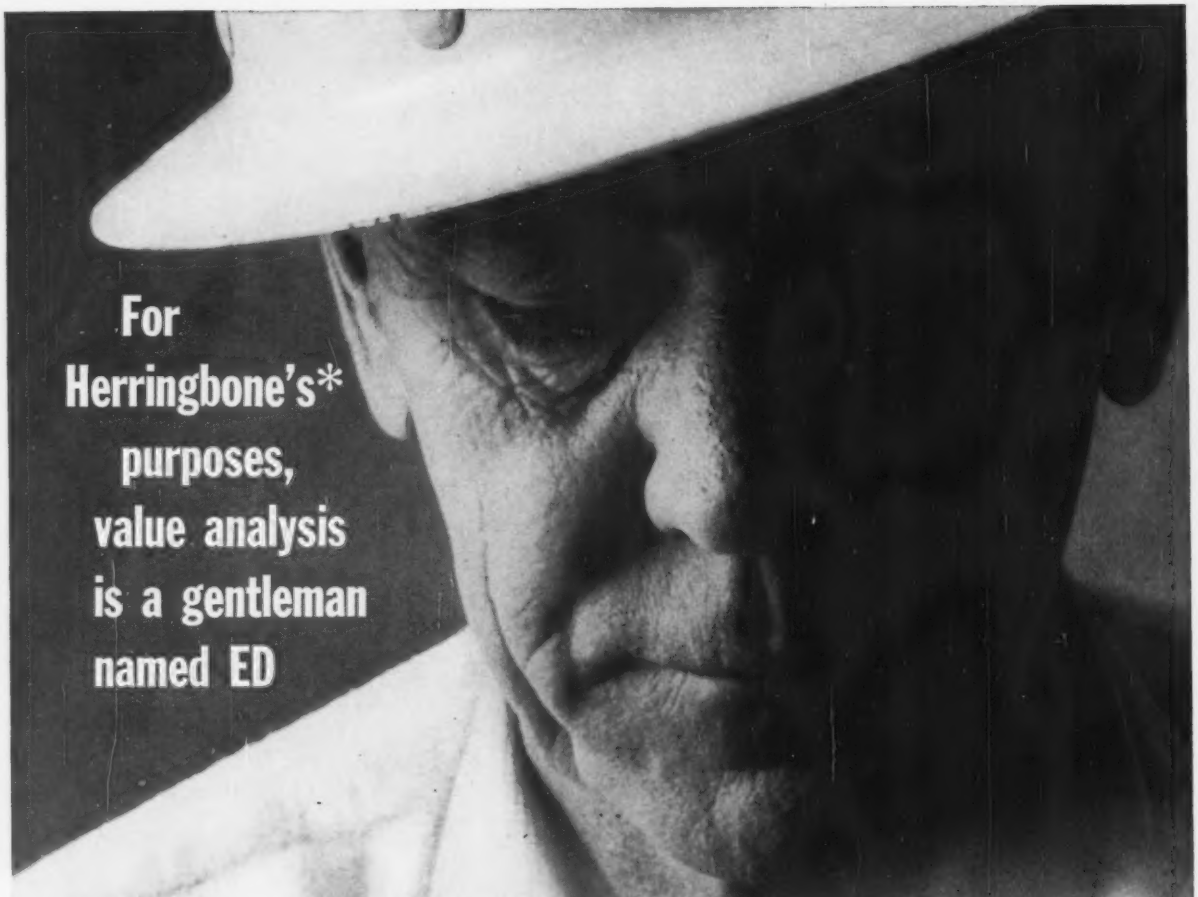
Because of this, and of other Bower features to be discussed in later technical reports, we suggest that you consider the advantages of Bower bearings in satisfying your future bearing requirements.

★ ★ ★ ★

Bower engineers are always available, should you desire assistance or advice on bearing problems. Where product design calls for tapered roller bearings or journal roller assemblies, Bower makes these also in a full range of types and sizes.

BOWER ROLLER BEARINGS

BOWER ROLLER BEARING DIVISION — FEDERAL-MOGUL-BOWER BEARINGS, INC., DETROIT 14, MICHIGAN



For Herringbone's* purposes, value analysis is a gentleman named ED

Or Joe, or Sven, or whatever the name of the man is in your organization whose opinion on wire rope you most respect. You can take all the value analysis forms ever made and fill them out and get some pretty promising answers. The straightest and clearest answer you'll ever get is from the head gentleman who *works* with the rope; the same man who comes back to you and tells you that the rope he works with *doesn't work*.

We take this stand because the new Roebling Herringbone is championed by men who work with it – the first to feel the impact of a wire rope's success or failure – and the first to tell you about either.

Roebling Herringbone–the two-ropes-in-one rope–is doing things that construction operators find hard to believe–but love to admit. It has prompted a series of some of the nicest testimonials you ever saw.

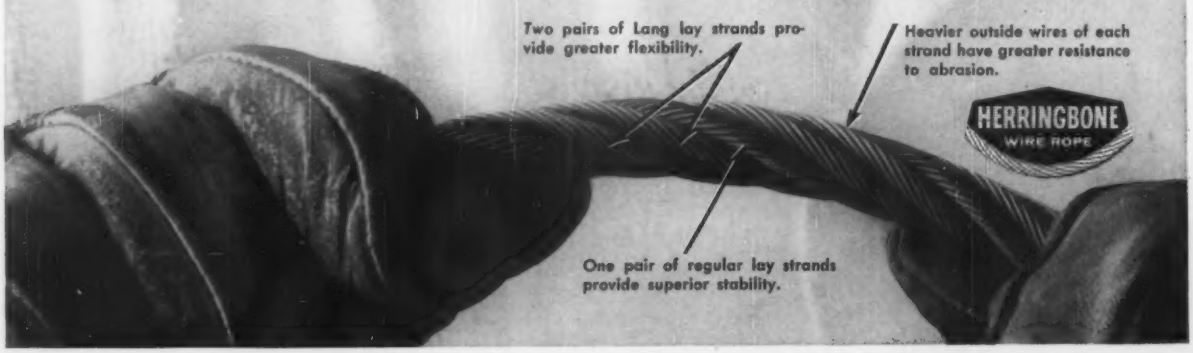
When you come right down to it, their satisfaction is twofold; after all they are working with both a Lang lay and regular lay rope in one. So they are getting the best that both types of rope construction have to give ... and that's plenty.

If you want to write us and get some pure, unadulterated field reactions, opinions from men who count, just drop a line to Wire Rope Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey. With these, we'll take the liberty of sending you the complete information on the rope that makes value analysis a sure thing by the mere specifying... Roebling Herringbone.

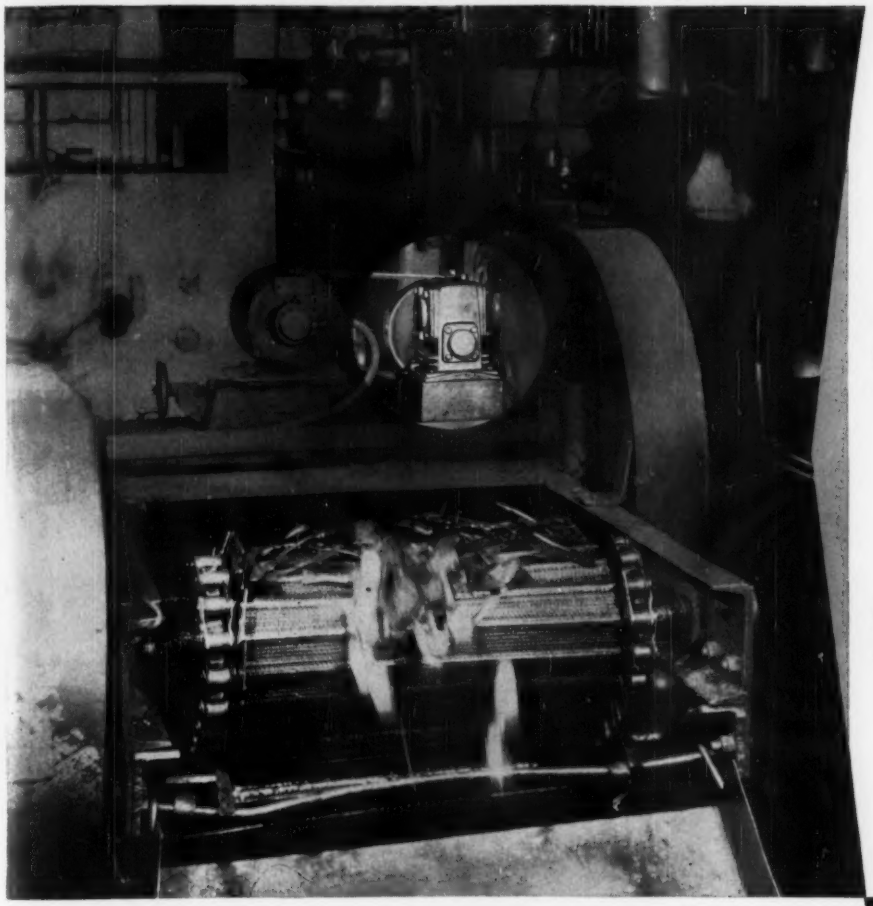
*Reg. Appl. For

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation


Two pairs of Lang lay strands provide greater flexibility.
Heavier outside wires of each strand have greater resistance to abrasion.
HERRINGBONE
WIRE ROPE
One pair of regular lay strands provide superior stability.

Foote Bros. Drives In the METALWORKING INDUSTRY

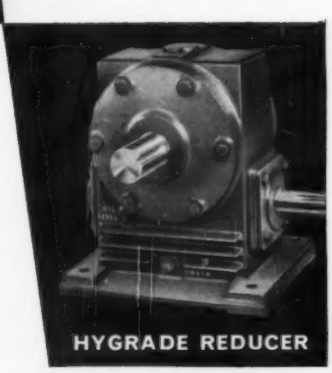


Hot Stuff Coming Up On Schedule

This small Foote Bros. Hygrade Worm Gear Reducer is driving a quench tank conveyor in a large midwest heat treating plant. Parts from the heat treating furnace drop on the wire mesh belt, which moves them through an oil quench tank on a precisely determined time schedule.

To provide the proper quench and insure on-time delivery of parts to the customer, the operation of this conveyor is of critical importance. Though it was installed almost two years ago, the Hygrade Reducer has operated perfectly under tough working conditions.

You can see Foote Bros. Hygrade Worm Gear Reducers in capacities ranging from 168 HP down to ⅓ HP, doing almost every kind of power transmission job in metalworking plants—from driving giant machines to powering small conveyors like the one shown here. The reason? Metalworking men *know* they can depend on Hygrade Reducers for the rugged stamina and reliability that has made them the buy-word in the industry.



Hygrade Reducers of this type are stocked by your Authorized Foote Bros. Distributor. Ask him for STOCK PRODUCTS CATALOG SPA, which describes the complete line.

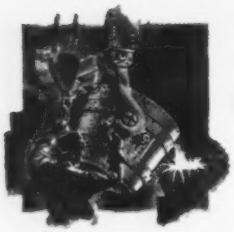
There's a Foote Bros. unit available to meet your drive requirements. Your Authorized Foote Bros. Distributor is as close as your telephone. Ask him to recommend the right unit for your requirements. Find his name in your Classified Telephone Directory.

100 YEARS SERVING INDUSTRY 1859-1959

FOOTE BROS.

Better Power Transmission Through Better Gears

FOOTE BROS. GEAR AND MACHINE CORPORATION • 4565 SOUTH WESTERN BOULEVARD • CHICAGO 9, ILLINOIS



AMERICAN ORIGINALS IN IRON AND STEEL

How iron plates helped win the West

In the early 1800's, when Lewis and Clark made their historic pioneering trip across the continent, their supplies were limited to bare necessities. Strangely, however, among these necessities were a number of *small iron plates.*

The Indians of the Northwest valued these plates very highly. They would trade approximately a bushel of grain for a piece of iron only 4 inches square. This metal enabled them to make better axes, implements, and weapons . . . to be suddenly transferred from the Stone Age to the Iron Age. Thus *iron* became a means of gaining the Indian's friendship, while indirectly helping to sustain the white man on his first coast-to-coast expedition.

The growth of our iron and steel industry, like the development of our country, also depended on the ingenuity of many men and the perfecting of many products. Among these products was Baker's MAGDOLITE, which today helps produce more uniform ingots . . . at lower refractory cost. It has proved superior in composition, preparation, strength, economy, and quality. Make a note of MAGDOLITE now . . . a name it will pay you to remember.

ANOTHER AMERICAN ORIGINAL

JEBCO
PRODUCTS
SINCE 1889

BAKER'S MAGDOLITE
The original dead-burned dolomite

THE J. E. BAKER COMPANY

YORK, PENNSYLVANIA • PLANTS: BILLMEYER, YORK, PENNSYLVANIA • MILLERSVILLE, OHIO

WHERE IN THE WORLD CAN YOU SHOP ALL THE WARES OF THE WORLD?

AT THE 3rd ANNUAL UNITED STATES WORLD TRADE FAIR MAY 8-19, 1959 COLISEUM NEW YORK

HERE—UNDER ONE ROOF — get the complete answer to the question, **What's new industrially?** . . . in a truly universal WAREhouse of engineering and construction products, materials and methods. Exhibits touching on every phase of modern industry . . . from Belgium, Czechoslovakia, England, France, Germany, Holland, India, Israel, Italy, Japan, Mexico, Poland, Spain . . . to mention just a few.

AMONG THE NEWEST WORLD-WIDE DEVELOPMENTS, see exclusive lines of . . . **Tools • Power Equipment • Electronics • Basic Materials • Office Equipment and Machines** . . . and find out about their application to your operation.

Learn How To Do Business With The New EUROPEAN COMMON MARKET! Get the facts about the European Common Market direct from government officials and manufacturers themselves . . . and learn how you can profit by it.

THE ONLY ESTABLISHED INTERNATIONAL MARKET in the Americas, the United States World Trade Fair last year attracted over 530,000 visitors, including 144,700 businessmen and buyers from all over the world. These men established invaluable contacts and accounted for a record-breaking amount of business

These statistics prove that the Fair is the most efficient, most effective way to build business and develop volume sales in the Western world today.

This Fair is an absolute **must** for alert, live-wire buyers. Be sure to attend!

SEND TODAY FOR YOUR FREE ADMISSION CREDENTIALS:

REGISTRATION COUPON FOR THE TRADE ONLY

Save time by registering NOW. Fill in and mail this registration coupon to the address below and your admission credentials will be mailed to you. There is no registration fee.

Please check below if you wish us to make hotel reservations for you.

PLEASE PRINT

NAME_____

TITLE_____

FIRM_____

STREET_____

CITY_____ STATE_____

TYPE OF BUSINESS_____

PRODUCTS MFG'D OR SOLD_____

Please check below the classification of your business

☐ Wholesaler ☐ Importer ☐ Retailer ☐ Exporter ☐ Mfrs.' Agent ☐ Manufacturer ☐ Dept. and Chain Store Buyer ☐ Other

☐ Please send us your hotel reservation blank.

UNITED STATES WORLD TRADE FAIR, 331 Madison Ave., N. Y. 17, N. Y.

Both parts need CONDUCTIVITY...

But this **BOLT** needs high strength, too

High yield strength and conductivity were best met by Silnic Bronze.

And this **IGNITION PART** calls for good machinability

Combination of machinability with ductility and conductivity called for Chase Tellurium Copper

Unique Chase Service helps you find the one wire that's right

FOLLOW-THROUGH right to the production line, working with foreman and workers, is one reason the Chase Wire Service Man can help you find the best answer to cold-heading problems. Call on him today!

Before you order wire again, get in touch with Chase. See for yourself how the unique Chase Wire Service Plan can help you. Here's how it works: you tell us what you do with wire—what properties you have to get—describe any problems you may be having. You send us parts, drawings of your products. A Chase Wire Service Man can help you find the one wire that's right for your needs among all those that Chase makes—or if Chase doesn't already make it, we'll *product-engineer* wire for your particular individual needs.

You can only get service like this from Chase—so turn your wire fabricating problems over to the man who knows wire best. That's the Chase Wire Service Man. You can reach him by calling your nearest Chase warehouse or district office, or by writing Chase Brass & Copper Co. at Waterbury 20, Connecticut.

PRODUCT-ENGINEERED WIRE

Chase®

BRASS & COPPER CO.

WATERBURY 20, CONN.

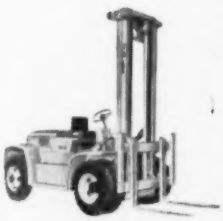
Subsidiary of ***Kennecott Copper Corporation***

THE NATION'S HEADQUARTERS FOR **ALUMINUM • BRASS • BRONZE • COPPER • STAINLESS STEEL**

Atlanta Baltimore Boston Charlotte Chicago Cincinnati Cleveland Dallas Denver Detroit Grand Rapids Houston Indianapolis Kansas City, Mo. Los Angeles Milwaukee Minneapolis Newark New Orleans New York (Maspeth, L.I.) Philadelphia Pittsburgh Providence Rochester St. Louis San Francisco Seattle Waterbury

YALE TRUCK OPERATES UNDER ALL CONDITIONS

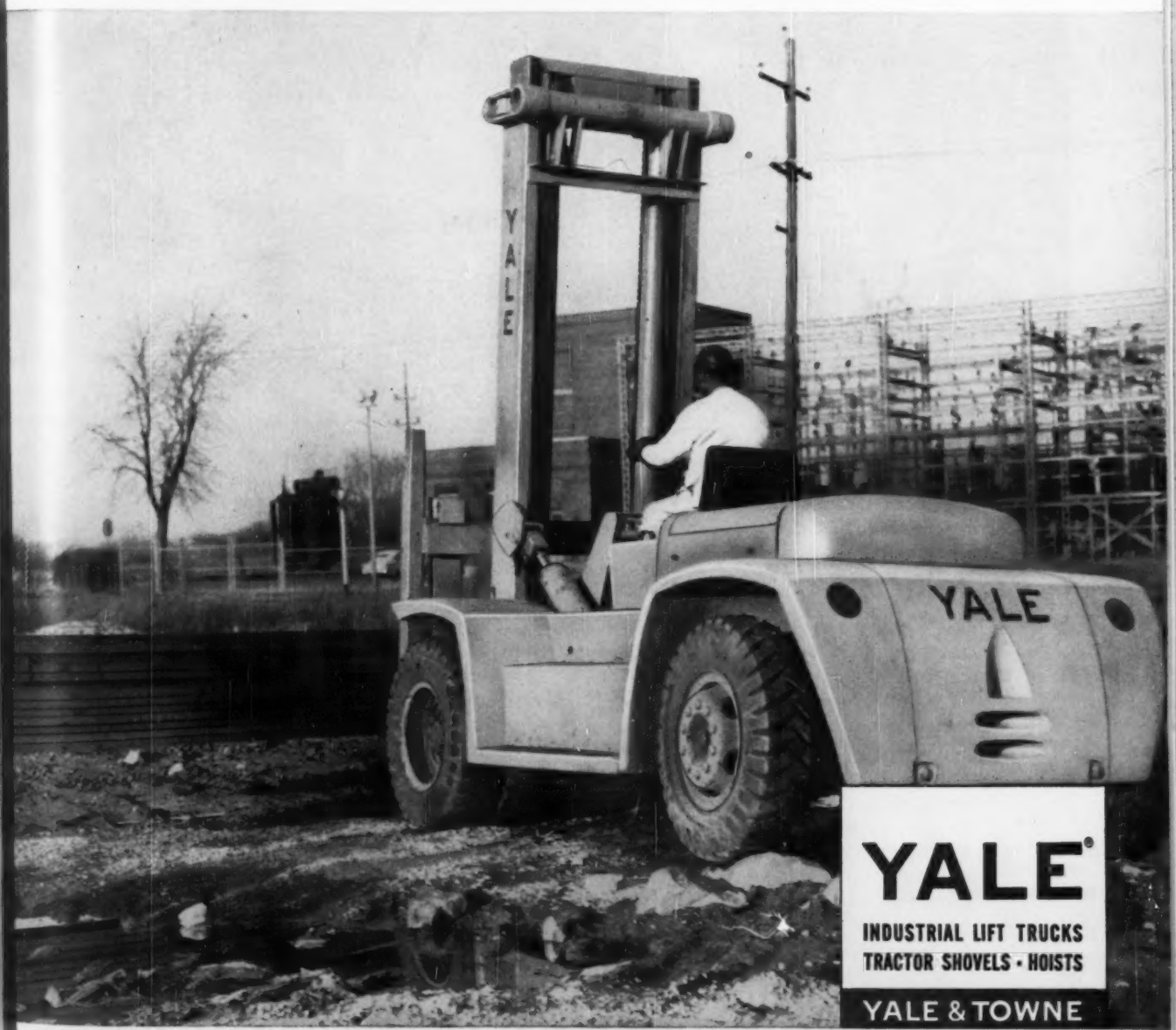
With speed, safety and stability . . . come rain, shine or rugged terrain!



Bringing loads of 15,000 to 20,000 lbs. over rugged terrain in any weather is part of a day's work for the Yale G-3. Twin cylinder lifting! Low center of gravity! I-beam frame assembly! Extra-rugged overall construction! It all adds up to stability never before attainable in a gas truck of this capacity.

As for speed! The Yale G-3 travels at 20 mph! Lifting speeds up to 60′ a minute—extra-fast, controlled lowering, too. Operations are carried out with unusual safety. Operator, seated between widely spaced uprights, has absolutely unhindered forward view. Excellent ground visibility to rear of truck, too.

The Yale G-3 is easily convertible to LP-gas. Available with fluid coupling, standard transmission or Yale's fully automatic Torque Transmission. For further information about this rugged member of Yale's profitable line of industrial lift trucks and hoists, contact your Yale representative. Or write for brochure #5230 to: The Yale & Towne Manufacturing Company, Materials Handling Division, Philadelphia 15, Pennsylvania, Department GT 1-V.



Yale Materials Handling Division, a division of The Yale & Towne Manufacturing Company. **Manufacturing Plants:** Philadelphia, Pa., San Leandro, Calif., Forrest City, Ark.
Products: Gasoline, Electric, Diesel and LP-Gas Industrial Lift Trucks • Worksavers • Warehousers • Hand Trucks • Industrial Tractor Shovels • Hand, Air and Electric Hoists

JONES & LAMSON MACHINE COMPANY

the man who needs a new machine tool is already paying for it

"See what the boys in the front room will have"

It's not hard to guess what they'll "have", if they can get it. *Every* management is looking for new, soundly-planned proposals which promise better productivity, lower costs, increased profits.

Where do such proposals come from?

Properly, they should come from people like yourself; the top production and plant operating men who know production best.

In order to convince the front office, to win them over to a new, improved production program, you *must* have the facts; the latest information on how to cut costs through new methods, new tooling, new equipment.

It's safe to say that whenever a sound new production proposal is rejected, it's because somebody either didn't have the *right* facts to present, or didn't present them in a convincing way.

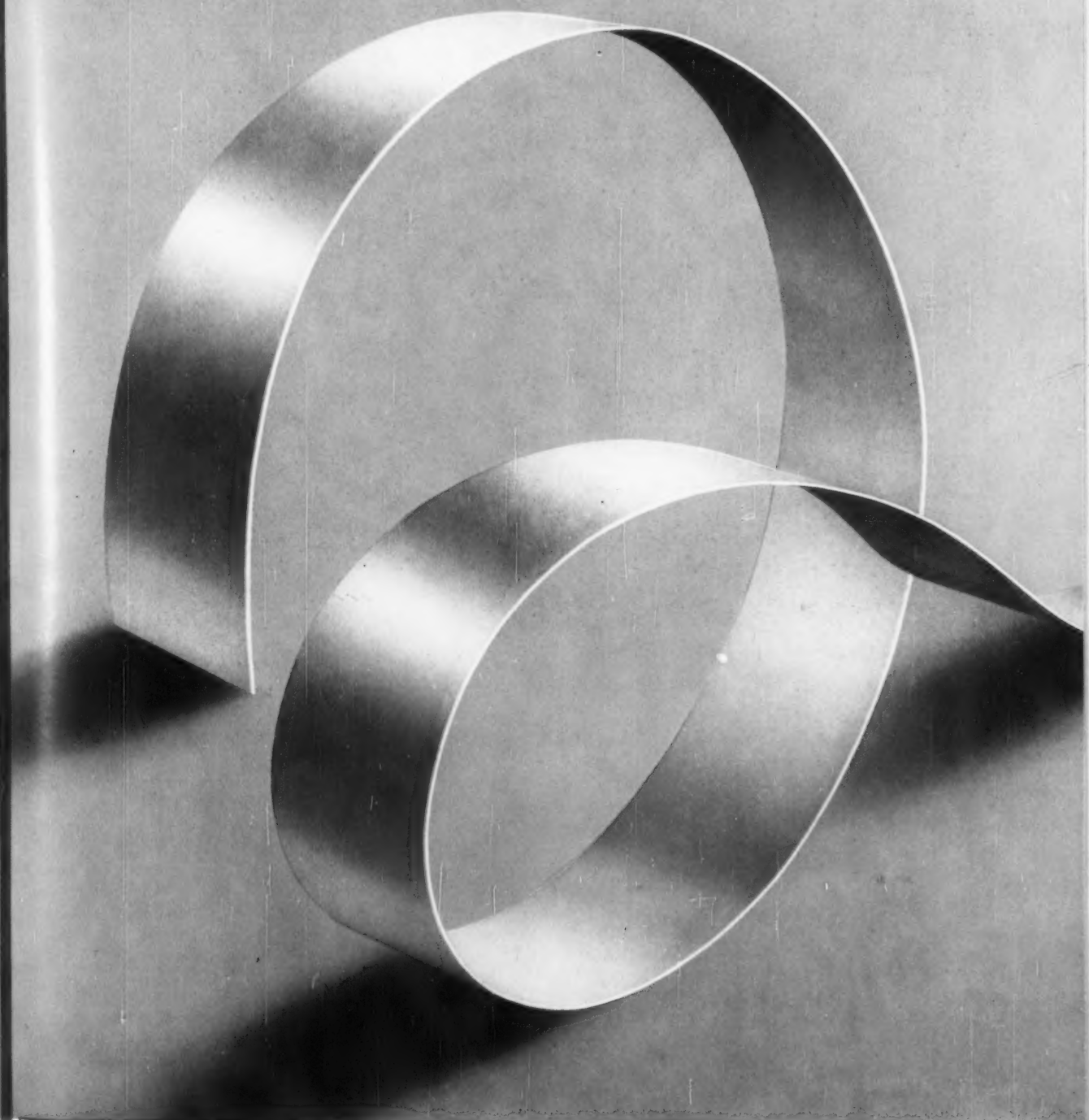
We can give you some real help. We'll supply the facts about J & L equipment and what it can do; and we'll show you how to organize these facts to make up a really well-planned, convincing replacement program.

Write today for information that could make your job a much better one. Jones & Lamson Machine Company, Dept. 710, 511 Clinton Street, Springfield, Vermont.

Turret Lathes • Automatic Lathes • Tape Controlled Machines • Thread & Form Grinders • Optical Comparators • Thread Tools

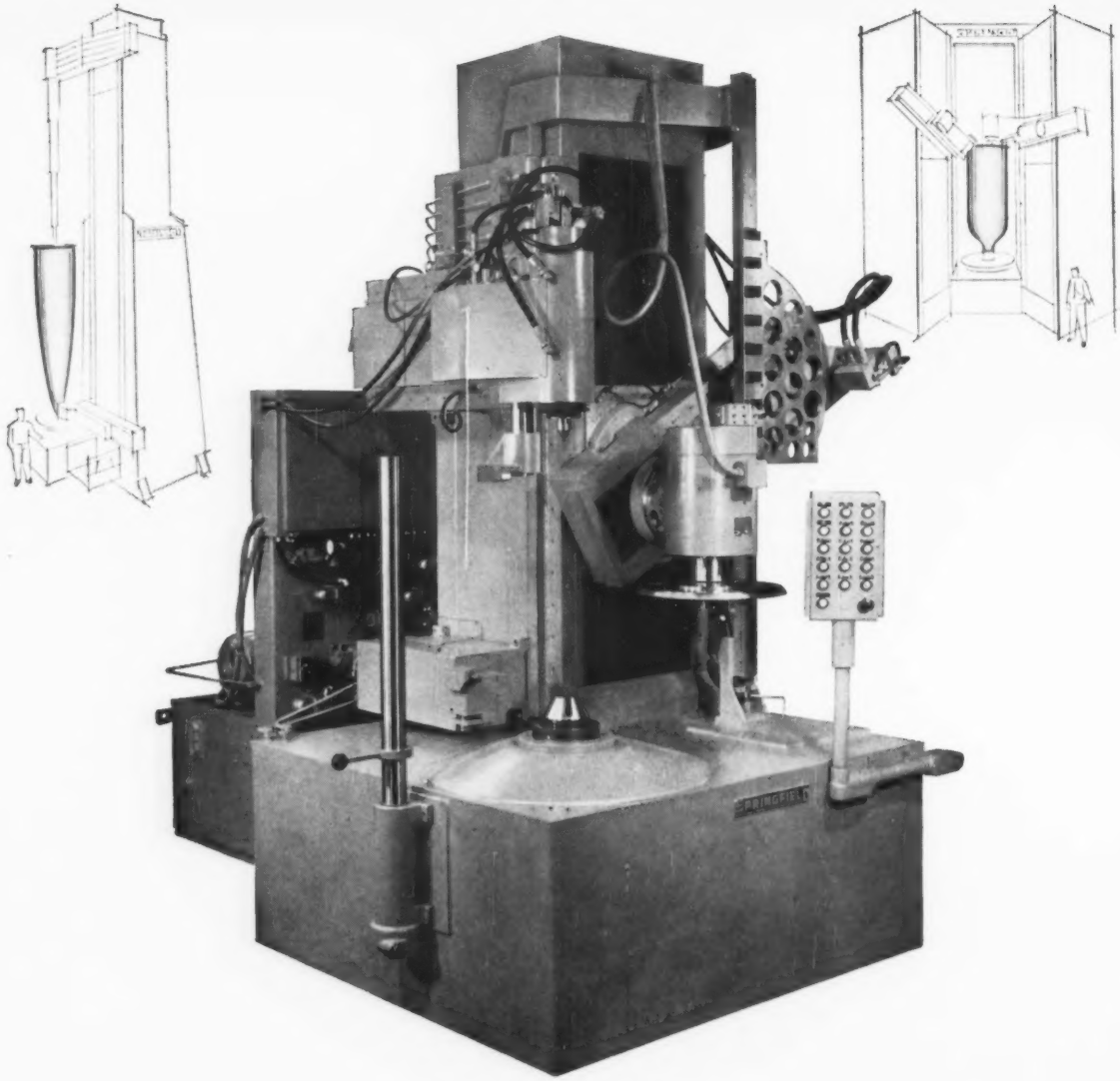
stainless strip—that reflects your specifications

Call Crucible to fulfill strict specifications for lustrous finish, uniform quality and gauge in stainless strip. For Crucible produces finishes of incomparable lustre by precision-rolling each coil on modern mills. Exact quality and gauge are consistently ensured because Crucible methodically checks each heat, measures gauges continuously with electronic controls. So why settle for less than strip that reflects your high standards? Call Crucible—a leading producer of stainless in gauges to .010" and in all widths. Or write: *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*



CRUCIBLE STEEL COMPANY OF AMERICA

Canadian Distributor—Railway and Power Engineering Corp., Ltd.



Vertical Grinding missile shapes

If you have anything to do with contoured missile shapes you should find out about this brand new breed of machine —the vertical contour grinder. The machine shown above turns and grinds a laminated missile nose whose surface must be smooth and accurate. The point is, this machine was designed for specific missile requirements, and yours may be similar. In vertical grinding the force of gravity works to help achieve concentricity, uniform wall thickness, accurate interior and exterior contours and extreme micro-inch finish. These grinders are designed especially for ceramic, metal, plastic and combinations of materials. Size and weight of workpiece is not limited.

The Springfield Machine Tool Company pioneered the principle of vertical grinding and was one of the first builders to incorporate the principle of hydraulic contouring in a machine tool. These ideas are found in hundreds of machines bearing the Springfield nameplate, and are your best assurance that we can bring to your problem both experience and imagination. Telephone, telegraph or write for informative literature.

THE SPRINGFIELD MACHINE TOOL CO., SPRINGFIELD, OHIO

SPRINGFIELD

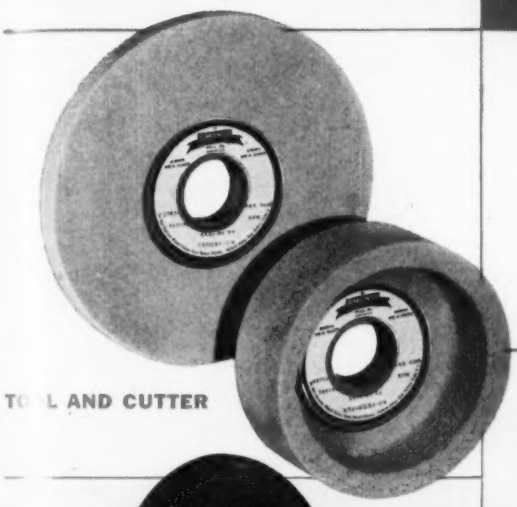
DIAMOND WHEELS
Man-Made and Natural Diamonds

SIMONDS ABRASIVE CO.

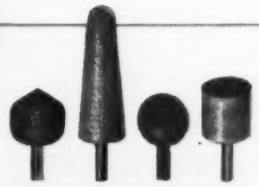
Grinding Wheels

For Savings and Efficiency on ALL your grinding jobs

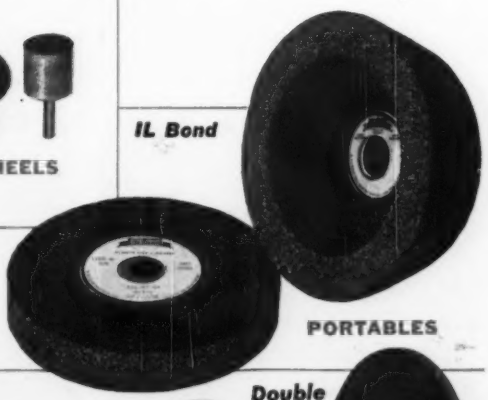
Grinding wheels for fast stock removal or micro-finishing! Toolroom wheels with new SA Borolon abrasive for improved cutting action! Portables with new IL Bond for longer wheel wear, better grinding! These, plus mounted wheels and fast long-wearing, non-burning cut-off wheels, are part of Simonds complete grinding wheel line — the line for consistently superior results with savings to match. Catalog bulletins on request.



TOOL AND CUTTER



MOUNTED WHEELS



IL Bond

PORTABLES

Resinoid Bonded

Rubber Bonded

CUT-OFF

REINFORCED RESINOID

Double XX

Fibrex

INDUSTRIAL DISTRIBUTORS
THE RIGHT HAND OF PRODUCTION

CALL YOUR SIMONDS DISTRIBUTOR

P roven products
D ependable know-how
Q uick supply

SIMONDS ABRASIVE COMPANY

Tacony & Fraley Sts., Philadelphia 37, Pa.
Division of Simonds Saw and Steel Co.
BRANCHES: Philadelphia • Chicago • Detroit • Shreveport
Los Angeles • San Francisco • Portland, Ore.

Granite City Steel reports up to 125 heats for tapholes "cast" with Permanente 165 Ramming Mix

New technique developed in cooperation with Kaiser Chemicals helps step up productivity of company's open hearth furnaces

Granite City Steel—whose outstanding modernization and expansion program has made it one of the nation's most efficient steel producers—has developed and proved a technique for "casting" tapholes when a furnace is down for ground rebuild. The "casting" practice (described in detail below) has produced the following exceptional results for four recent Granite City tapholes:

Furnace No.	Capacity	Taphole Life
22	250 T	125 heats
23	250 T	113 heats
24	250 T	92 heats
25	400 T	80 heats

Operators who have switched to Permanente 165 Ramming Mix consistently report exceptional performance—whether for new tapholes, for hot tapholes, or for furnace bottoms!

Permanente 165 is made from high purity Kaiser Periclase refractory grains (94-96% MgO) and ceramically bonds itself into a crystalline mass at relatively low temperature, providing fast furnace availability. This monolithic structure has exceptional volume stability, maximum resistance to hydration and to attack by iron oxide and slag. For furnace bottoms, its high density (averaging 175 pounds per cubic foot after firing) assures longer life.

Make your own comparison test and see how much more life you get with Permanente 165 Ramming Mix. Your Kaiser Chemicals sales engineer will be glad to show you this taphole casting technique or to help with any basic refractories job.* Ask to see the new 30-minute color movie, "Progress in Modern Basic Refractories." Your Kaiser Chemicals Sales Representative or Regional Office will be glad to make the arrangements.

*Ask for details on the new K/R Gunning System.

Call or write Kaiser Chemicals Division, Dept. S9122, Kaiser Aluminum & Chemical Sales, Inc., at any of the regional offices listed below:

PITTSBURGH 22, PA. . . . . 3 Gateway Center
HAMMOND, IND. . . . . 518 Calumet Building
OAKLAND 12, CALIF. . . . . 1924 Broadway

KAISER CHEMICALS

Pioneers in Modern Basic Refractories

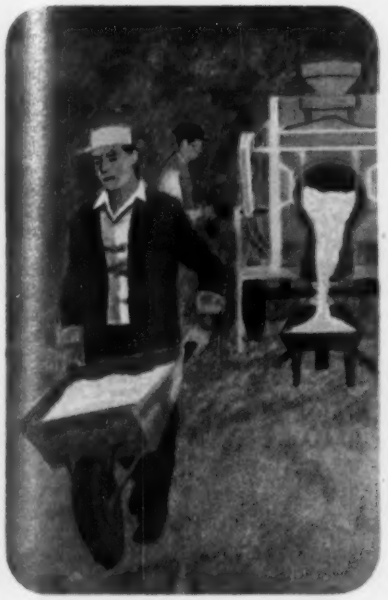
REFRACTORY BRICK & RAMMING MATERIALS • K/R GUNNING SYSTEM
CASTABLES & MORTARS • PERICLASE • DEADBURNED DOLOMITE • ALUMINAS

1 In the Granite City Steel practice developed with Kaiser Chemicals, the first step is to dig out the hole to a diameter of approximately thirty inches. Although practices will vary from shop to shop, this digging usually goes down to brickwork under the pipe, and includes two to three feet of the flat in front of the pipe.

2 Next, a ¼-inch steel plate is welded to the casting in back of the furnace and a hole for the taphole pipe is cut in it at the proper height. The pipe is then set at the proper angle, with the back end protruding through the plate and the front end blocked up with brick . . . ready for the casting forms.

3 Carpenters erect a three-sided wooden form, following the indentations of the back banks as closely as practical. A "plug" nailed inside the front wall of the form fits into the pipe, supporting it so that blocking can be removed. Pipe is now welded to back plate . . . form solidly braced . . . and deck built around form.

Open hearth furnaces at Granite City Steel Company, Granite City, Illinois.



4 The Permanente 165 Ramming Mix is mixed in either regular mixers or mixer trucks. From seven to nine per cent water is used. Mix is at proper consistency when a high-frequency cement vibrator immersed in the Permanente 165 produces a "jelly-like" appearance.

5 When the Permanente 165 mix is poured into the form, the vibrator is used to achieve uniform mix density around the entire pipe. *This is the important feature* of the cast taphole: uniform density of mix at least six inches thick around pipe. Excessive vibrating must be avoided to prevent floating out of bond.

6 Although forms can be removed after only three or four hours, life is improved if the Permanente 165 casting is allowed to cure for several days. After the form is removed, the small section of the flat in front of the casting can be filled either by ramming or casting.

"We've cut stainless costs with ferromanganese-silicon"

Ferromanganese-silicon allows savings of as much as $8 per ton, depending upon practice, in the production of high-manganese stainless steels. It also reduces manganese costs for the chromium-nickel grades of stainless.

The alloy is both an efficient slag reducing agent and the lowest-priced source of low-carbon manganese currently available. For details on cost reductions in your practice, contact your UNION CARBIDE METALS representative.

UNION CARBIDE METALS COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.

Ferromanganese-silicon gives lower costs, rapid solubility, and high manganese recoveries.

UNION CARBIDE METALS

Electromet *Brand Ferroall*
and other Metallurgical Produc

THE

The terms "Electromet" and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

FURTHER INCREASES IN INTEREST RATES could be in the offing. That's the impression given by the Federal Reserve Board. The Board regards inflation as an ever-present danger to the economy. Making money costlier to borrow is one way to control it.

A NEW MAN-MADE RUBBER is now on the market. U. S. Rubber Co., and Shell Chemical Corp., call it Polyisoprene rubber. They say it's the man-made duplicate of tree-grown rubber. It will sell at a price competitive with natural rubber.

DIESEL LOCOMOTIVE BUILDERS are looking ahead to a big replacement market. General Electric Co. estimates the market will hit close to $250 million a year by 1963. The export market will also be good--at least $5 billion over an indefinite period of years through sales to replace existing steam locomotives.

THE AMERICAN PEOPLE are feeling better about their financial outlook. A survey by the Federal Reserve Board indicates that more people plan major spending this year than in early 1958. Nearly four in 10 reported they were better off financially than a year ago, compared with one in three in early '58.

RAILROAD CARLOADINGS ARE UP. The Assn. of American Railroads says loadings of revenue freight for the week ended March 7 were nearly 600,000 cars. This was more than 50,000 cars more than in the corresponding week of 1958.

STEEL CASTING SALES could hit a new record this year. The word from industry leaders attending the 57th annual meeting of the Steel Founders' Society of America is that shipments this year could hit 1.7 million tons. Current record is 1.5 million tons set in 1951.

HERE'S THE LATEST ON THE 'SMALL' CAR: Chevrolet will start producing a small car in September, introduce the car in October. Ford output will begin in October, will be introduced in late November or early December. Chrysler isn't expected to introduce its entry until next January.

NEW HOUSING STARTS will probably ease during 1959 from the record rate of last December. The Value Line Investment Survey gives this reason for its forecast: "The shift in emphasis of government planning from combatting recession to combatting inflation means that government encouragement of home building will be less this year than in 1958." However, the Survey still expects a good year for construction as a whole.

Processing line speed control no problem . . . thanks to Cleveland Speed Variator

At Armco Steel's Middletown Works, one rugged 7K6 Cleveland Speed Variator provides infinitely variable speed progressions for one of their many steel processing lines. This electrically remote-controlled unit is shown driving the line's conveyor pay-off reel station. All Clevelands feature simple, precise construction which makes for a compact, quiet-running, instantly-adjusted drive.

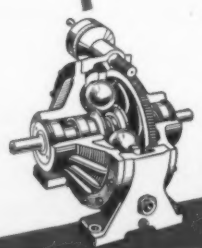
If variable speed drives are indicated on your production processes, then Clevelands are the logical choice. Write today for illustrated Bulletin K-200 for complete specifications, sectional drawings and rating tables on the full line of Cleveland Speed Variators.

The Cleveland Worm & Gear Company, Speed Variator Division, 3282 East 80th St., Cleveland 4, Ohio.

Sales representatives in all major industrial markets.
In Canada: Peacock Brothers Limited.

HOW IT WORKS

Power is transmitted from input shaft to output shaft through alloy steel driving balls which are in pressure contact with discs attached to the two shafts. Relative speeds of the shafts are adjusted by changing the positioning of the axles on which the balls rotate (see cutaway view, right).



CLEVELAND SPEED VARIATOR

How Fasteners Meet Challenge Of New Industry Demands

Industry today needs fasteners that will take higher stress and higher temperatures. In mass production, greater speed of assembly means big savings.

Both standard and precision fasteners are meeting these new requirements. But users need education too.

▪ Industrial fasteners have come a long way from the black nuts and bolts era. And the end is not in sight.

From the black bolts of two or three decades ago (and still a popular item), the industry is right into the missile era. Bolts for missiles now being turned out are centerless ground, have surface finishes ranging from 60 down to 20 microinches, tolerances of 0.0005 in., tensile strengths up to 260,000 psi, and are designed for temperatures up to 1600°F.

Dollar Volume Up—The fastener business is now reaching for a dollar volume of $1 billion, in spite of the setback in recession-hit 1958. The doubling in dollar volume in a decade, while tonnage of steel remains relatively the same, reflects the upgrading of the industry. (See chart.)

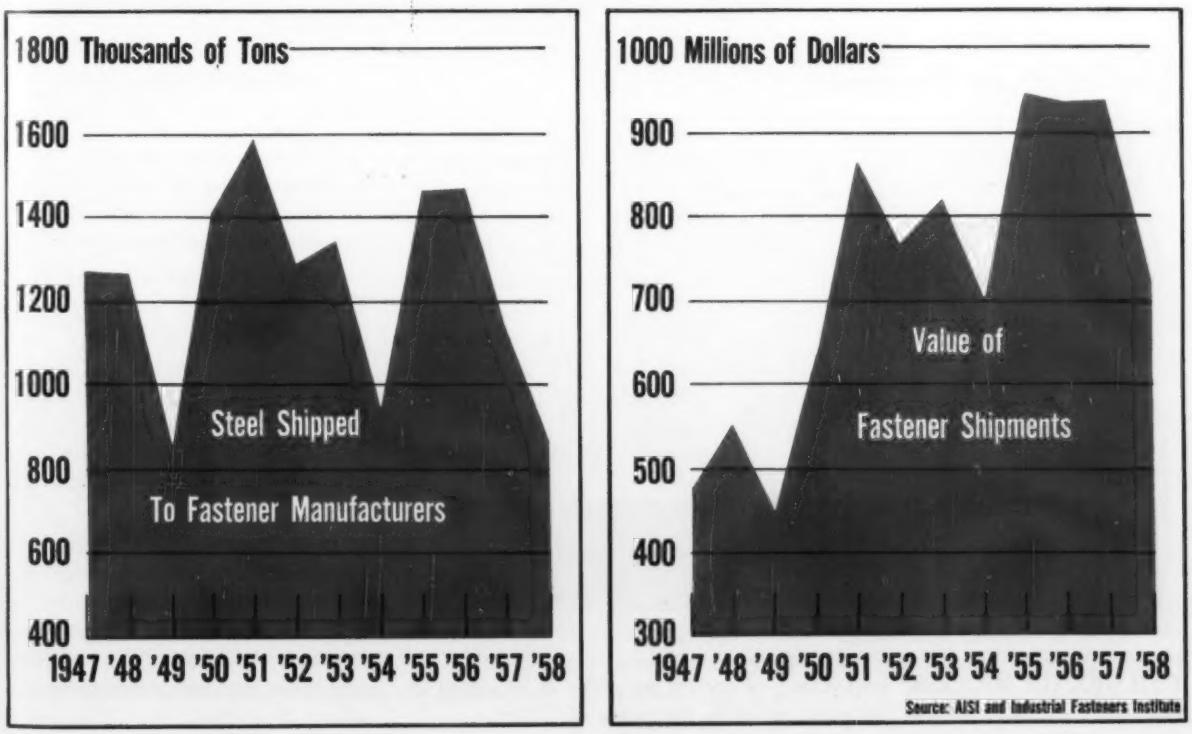
The difference is in better quality, closer tolerances, more intricate shapes, higher quality steels and alloys, new materials, plus normal inflation.

Growth Potential—The trend is bound to continue. New demands from missiles and jet planes, nuclear energy, domestic electric power, and higher speed of industrial machinery all require more from their fasteners.

"Growth aspects of the industry are now concentrated in the type of fastener that will perform in an area of high strength and temperatures," predicts James V. Lester, vice president, Standard Pressed Steel Co., Jenkintown, Pa., precision fastener makers.

Another factor is that new fasten-

Value Grows Faster Than Volume



ers can save far more than their own value in cutting assembly time and in material savings.

Precision Trend—L. S. Harvey, technical director of Lamson & Sessions Co., Cleveland, sees a continuing trend toward use of alloys—many of them heat treated—smaller fasteners for miniaturization, and higher stresses.

"We are already seeing the trend in bolts for auto engines," he says. "Space is at a premium, stresses are higher, and so are temperatures. So the manufacturers will spend the money for finer fasteners and still be ahead."

Upgrading Materials—The trend to higher strength fasteners that will withstand more heat, resist corrosion, and to avoid fatigue failure is leading to new materials and design in the precision fastener field. Fasteners are being upgraded from carbon steel through alloys and into the ceramic metals as demands increase.

Robert L. Sproat, chief metallurgist at Standard Pressed Steel, outlined some of the progress made in precision fasteners:

"Ordinary bolts will take 500°F. But at the other extreme, we are now being asked for temperatures of 2000°F."

He points out that alloy steels, including higher-alloyed steels, stainless, and tool steels will go through the 900°F to 1000°F range. Super alloys will go through 1200°F. From 1200°F to 1600°F, materials are restricted to nickel-based alloys —M-252, Udimet 500, and Waspalloy.

From 1600°F to 1800°F some cobalt-based materials come into the picture.

Refractory Metals—"Upward from there, we are looking for refractory metals, molybdenum and columbium," Mr. Sproat says. He predicts they will be developed this year for temperatures up to 2000°F.

In going to miniaturization, the striving for greater strength and smaller size extends to material and design. Ordinary bright cap screws have a tensile strength of 70,000 psi.

Now, according to Mr. Sproat, fasteners for 300,000 psi are being developed. The range has already been extended to 260,000 psi through the use of tool steels.

As demands for greater tensile strength mount, materials graduate to the alloy steel group. When close to 180,000 psi is demanded, better control of dimensions is also needed. Thread contour is changed. SPS goes to a 12-point external wrenching for high fatigue applications.

Where lighter weight and high strength is needed, titanium fasteners are making gains. This is one area where use and acceptance of titanium is growing. Beryllium is also getting attention, but at present is not acceptable for structural applications.

Precision Developments — Some other SPS conclusions:

Making molybdenum and columbium fasteners for 1800-2000°F applications hinges on development of suitable protective coatings.

Stronger fasteners, up from 220,000 psi strength to 280,000 psi and 300,000 psi will come from improved higher strength steel alloys and better understanding of bolt design on behavior at high stress levels.

Beryllium should achieve wider use with better knowledge of how design and other factors can overcome its brittleness so its light weight can be taken advantage of. Applications now are largely in atomic energy with some use in spacecraft guidance system.

Improved alloys will strengthen titanium fasteners. Pure titanium bolts are now used where corrosion resistance, not strength, is the factor. But titanium bolts with 180,000 psi and with temperature applications over 300°F are likely this year.

Major Problems—Two problems are common to both precision and standard fastener makers:

1. Users are not educated to select the fasteners to do the job best and most economically.

2. Ultimate success of the fastener depends on the man who tightens it. Conclusion among fastener makers is that proper measures to assure correct tightening are not taken.

In the precision fastener area, the problem in use is that users are not up on latest developments. In the standard fastener field, designers are not aware of how to make the best and most economical use of fasteners on the market.

The Human Element

FAILURE OR SUCCESS? Importance of correct assembly is indicated in this SPS cartoon. Careless tightening is often the cause of failure.

Education Needed — Mr. Lester of SPS says, "Developments in precision fasteners are so rapid that an educational program is needed."

"Because of lack of specific knowledge, designers frequently specify larger bolts than are necessary, possibly the wrong head style, but very seldom recommend tightening torque," says John S. Davey, vice president, engineering, Russell, Burdsall, and Ward Bolt & Nut Co., leading maker of standard fasteners. "No product as simple as a nut and bolt is so misused.

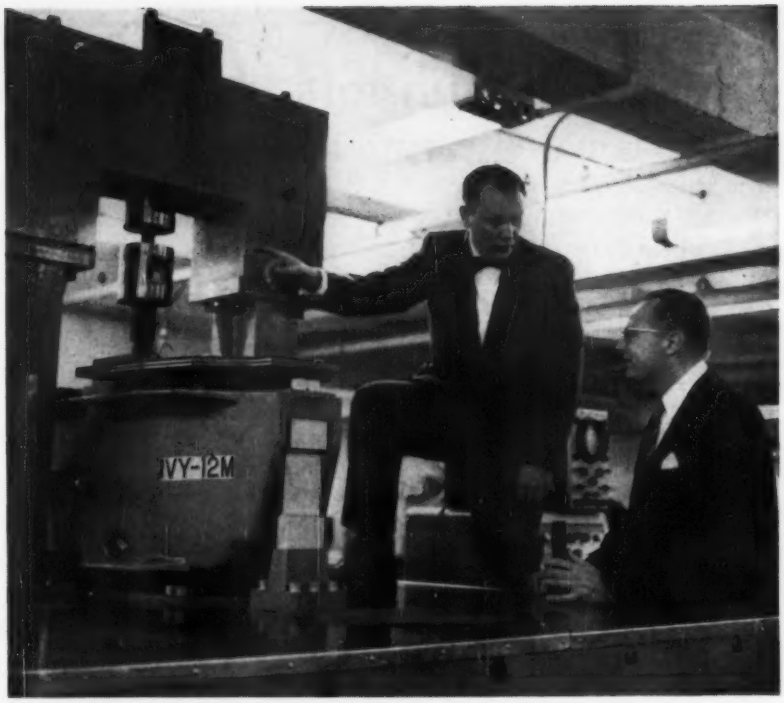
"Very often users have no knowledge of cost," he continues. "They may be thinking in terms of pennies in regard to bolt costs, where the company actually may spend millions of dollars a year for fasteners. Frequently, we can save 25 pct of a company's total fastener costs."

Can Do Better Job—Mr. Harvey of Lamson & Sessions agrees. "We are still a long way from doing our best for industry because we don't often get the chance. If product designers would only tell us the job they want done and let us design the fastener, we could make better ones and save money all around.

"Some prints come in here with ridiculous tolerances which will double the cost. We have been able to reduce costs materially and pass them on. We also like to see samples of what is being used. Often it will do as well as the blueprint."

Cut Labor Costs — Although over-specifying is the most common fault, frequently labor costs can be reduced by specifying the correct fastener. Putting a fastener together generally costs more than the fastener does. High-volume assembly users will pay more for the fastener if it works simply and quickly.

Companies like Tinnerman Products Co., Cleveland, are constantly bringing out new, intricately shaped fasteners for trim, wire, and similar items on autos, appliances and similar products. Timmerman has developed as many as 20 new parts per week, with customer savings as high as 80 pct.



CHECKED OUT: New ideas in fasteners are subjected to severe testing at SPS laboratory. Chief Metallurgist Robert Sproat, left, and Vice President James Lester check results of fatigue test in progress.

A time-saving fastener that is making progress in construction is the high-tensile bolt. Although costing perhaps three times as much as rivets, it can be assembled in the field faster—and silently. In much shop fabricating, however, the rivet will continue to hold the edge.

Man With the Wrench—In standard as well as precision fasteners, more attention is being placed on actual assembly.

To get the most from the precision high-strength, high-temperature fasteners, it is necessary to refine the conditions of use, to make sure of alignment and proper tightening. There are load-indicating washers and load-indicating bolts, but the need for reliable measurement is still there.

In standard fasteners, Mr. Davey points out that tightening is a supervision factor. He says that the man on the wrench frequently has no supervision or advice.

"There are a number of good wrenches on the market, and a lot can be done if it is given attention. Many times they attribute failure to the bolt where the fault may be in the tightener."

Fastener makers concede that there is a strong tendency to "design away" from fasteners, but they also contend they have won back many applications. One principal reason is that any assembly that may have to be disassembled is more or less permanent property for the nuts and bolts field.

This goes for such diverse products as freight cars and missiles. Need of repairing freight cars has resulted in regaining some lost markets there. On the missile and aircraft side, need of access into the interior after assembly has resulted in greater use of fasteners where welding was once considered a must.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

Are Steel Founders Heading for a Record?

The Outlook — At last week's 57th annual meeting of the Steel Founders' Society of America, corridor talk naturally centered around the improved business outlook this year as compared with 1958.

In fact, some of those in attendance said they would not be surprised if shipments of carbon steel castings this year established a new record of 1.7 million tons. Others looked for still better business in 1960, with shipments of about 2.0 million tons.

Will Steel Strike?—"Of course, there are some 'if's' in this situation," said one foundryman. "And the biggest one is whether there will be a steel strike. That would certainly knock the props out from under the economy in more ways than one—assuming a walkout were to last more than a couple of weeks."

The current record for steel castings shipments was established in 1951, when more than 1.5 million tons were taken in by foundry customers. The next best year was in 1956, when more than 1.4 million tons were shipped. Low point in the last eight years was the 800,000 tons sold in 1954.

Why Steel Foundry Sales Are Up

Better Business Climate Has Helped a Lot

Optimism was plentiful as the steel founders got together for their annual meeting.

Order books are filling at the fastest pace since 1957. And continued gains are expected. —By K. W. Bennett.

▪ Steel founders are confident. As they gathered in Chicago last week for the annual meeting of the Steel Founders' Society the reasons were apparent:

Sparked by a sharp sales upswing, founders are increasing output and filling order books at the fastest pace since 1957. With deliveries stretching out, more buyers are placing late second quarter requirements. And the outlook is for continued gains through the first half, with a better sales rate for the entire year.

Building Backlogs—J. D. Lanterman, President of American Steel Foundries, says, "We first noted a pickup in November, and the pace has been accelerating ever since. New freight car orders went up substantially in February. Orders for castings are gaining at a faster rate than anyone expected. Our own consolidated backlog was less than 60 days only two months ago, and it's already extended to 90 days."

S. G. Falk, Falk Corporation, comments, "Business is picking up generally. We see a 20-25 pct increase in 1959 steel castings sales. January saw substantial gains over fourth quarter."

James Jackson, Sales Manager for Burnside Foundry, reports, "We've had a very surprising upturn in January and February. We're all set for March and April as well. We'll hit 80 pct in these two months. We see a very good first half, and gains for the entire year over 1958."

What's Happening — Here's what's happening to steel castings markets: The railroad car industry absorbs roughly 30-35 pct of steel castings output. Car orders are up and gaining. Off-the-record industry speculation is that sales to car builders will score even stronger gains in second quarter. Rolling mills are another heavy user of steel castings (12 pct of output) and the steel industry appears headed for a billion dollar capital spending year.

Earthmovers take 11 pct of steel castings output. And the earthmoving equipment builders are counting on business gains of over 12 pct this year. (See The IRON AGE, February 12, p. 59.)

Three Reasons Why—The sudden order upsurge has come mainly as old-line customers began to sense a better climate for their own products. But at least three other factors will be increasingly important as the steel castings industry moves into the second quarter.

1—) A steel strike would close down many major foundries which have USW unions. Their customers will be stockpiling some castings in anticipation of a strike.

2—) The increasing delivery times required by many steel founders are bound to stampede uncertain buyers into action.

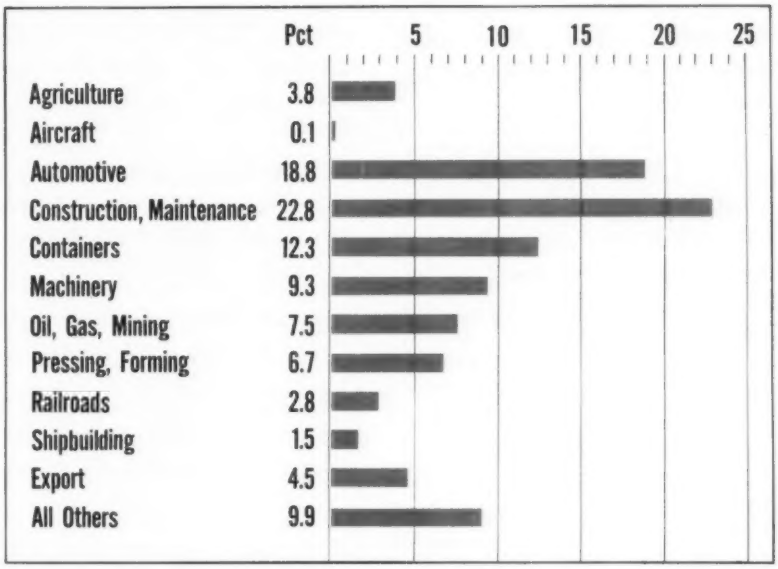
3—) Steel founders are picking up some good dollar volume business from some relatively off-trail markets.

Builders Again Lead Steel Users

Construction Topped Steel Consumers in '58

Steel shipments totaled 59.9 million tons last year, down almost 20 million tons from 1957.

Purchasing by most industrial groups declined, but a few maintained or increased their total tonnage.



■ The nation's largest steel consumer in 1958—for the third year in a row—was the construction industry.

The builders, who held the lead they took from the auto industry in '56, used more than one-fifth of all the steel shipped. But the 13.6 million tons they bought in '58 was well below their 1957 consumption of 16.5 million tons.

Auto Industry Second—Automotive steel buyers, according to an IRON AGE analysis of shipments reported by the American Iron and Steel Institute, again finished in second place. The automakers accepted 11.3 million tons of steel last year, a drop from the 15.7 million tons bought in '57.

The figures in each case include shipments from producing mills, steel service centers, and distributors.

Declines for Most—Steel use by most industries declined last year as total shipments dropped to 59.9 million tons, down almost 20 million tons from the '57 level of 79.8 million tons.

A few industries either maintained their consumption rate or bettered it slightly during 1958. They included: Pressing and forming, containers, and agriculture. All other groups shown in the chart (left) took less steel in '58 than in '57.

Containers Move Up — Third largest steel consumer last year was the container industry with a total use of 7.2 million tons, above the 6.8 million tons of 1957.

Miscellaneous steel users took 5.9 million tons in 1958, while machinery held its fifth place position with purchases of 5.5 million tons.

Steel use by the oil, gas, and mining industry, sixth largest consumer, was 4.5 million tons, down from 8.3 million tons the previous year. The pressing and forming industries consumed about the same amount of steel in '58 as they did in '57—4 million tons.

Export tonnage dropped substantially in '58, down to 2.6 million tons from 5 million tons in '57.

Steel Distribution by Consuming Industries

In Thousands of Net Tons

	1952		1953		1954		1955		1956		1957		1958	
	Tons	Pct	Tons	Pct	Tons	Pct	Tons	Pct	Tons	Pct	Tons	Pct	Tons	Pct
Agriculture	2,764	4.07	2,547	3.18	2,417	3.83	2,802	3.3	2,456	3.0	2,236	2.7	2,232	3.8
Aircraft	163	0.23	180	0.23	97	.15	107	.12	153	0.2	110	0.14	68	0.1
Automotive	12,232	17.99	16,506	20.59	12,959	20.52	20,834	24.6	15,952	19.2	15,788	19.7	11,303	18.8
Construction and Maintenance	11,749	17.28	14,225	17.75	12,906	20.44	15,811	18.4	16,734	20.1	16,514	20.8	13,683	22.8
Containers	6,218	9.15	6,769	8.45	6,427	10.18	7,462	8.8	7,650	9.2	6,895	8.6	7,290	12.3
Machinery, Tools	6,131	9.02	7,307	9.12	5,802	9.19	7,854	9.3	8,466	10.2	7,355	9.2	5,563	9.3
Oil, Gas, Water, Mining	5,973	8.78	7,211	8.98	6,097	9.65	7,336	8.7	7,620	9.2	8,384	10.4	4,524	7.5
Pressing, Forming, Stamping	3,640	5.35	4,994	6.23	3,828	6.06	5,295	6.3	5,347	6.4	4,076	5.0	4,052	6.7
Railroads	4,575	6.73	5,454	6.80	2,780	4.40	3,989	4.7	4,815	5.8	4,565	5.6	1,703	2.8
Shipbuilding	1,152	1.70	976	1.22	549	.87	667	.78	853	1.0	1,412	1.7	886	1.5
Exports	3,665	5.39	2,998	3.74	2,774	4.39	3,583	4.2	4,063	4.9	5,050	6.3	2,695	4.5
All Others	9,750	14.34	10,985	13.71	6,517	10.32	9,186	10.8	9,138	11.0	7,405	9.2	5,911	9.9
Total	68,004	100.00	80,152	100.00	63,153	100.00	84,717	100.00	83,251	100.00	79,894	100.00	59,914	100.00

IRON AGE compilation and distribution formula from data by American Iron and Steel Institute

Labor Reform Faces Tough Going

But Unions Won't Have It All Their Own Way

Need for some control over labor's power is conceded by most lawmakers.

They differ widely over areas of danger and extent of control. —By N. R. Regeimbal.

▪ There is little chance that Congress this year will succeed in checking labor's tremendous power. No tough labor reform law is likely to pass this session.

But unions have found that the clear control they thought they had achieved over Congress last election is not so clear, after all. The unions have hit some snags. Time is one.

Showdown Coming—Union strategists hoped to have a sweetheart labor bill passed by Easter and thus head off for several years, if not forever, any tough reform measure. Now, showdown action is coming up soon—possibly in April.

Stubborn resistance from proponents of tougher legislation has surprised the unions. This resistance has slowed the once steamrolling Kennedy - Ervin (labor-backed) bill. It will, in the end, force some concessions to be made. Most insiders — including those fighting the hardest—concede that any changes will probably be minor.

Two Major Issues—Two basic problems are at issue. One is the need for legislation to clean up internal union operations—to lift the racketeers and hoods off the back of the working man by barring them from union office. All sides concede the need for this clean-up, although the methods favored vary.

The most bitter fights involve efforts of the Administration and conservative elements to clamp some curbs over the vast—and often abused—economic power of today's massive, centralized labor movement. This the unions and their supporters are fighting tooth and nail.

Which Will Win?—The current labor law fight resembles three express trains racing down converging tracks with a smash unavoidable. The question is whether the front-runner can make it through, in what kind of shape, or whether all three will be demolished.

In brief, the front runner is a measure (S. 505) sponsored by Senators John Kennedy, D., Mass., and Sam. J. Ervin, Jr., D., N. C. This measure was drafted largely by union lawyers and the Democratic staff of the Senate Labor Committee. This is naturally the weakest reform proposal, and deals only with cleaning up unions and some Taft-Hartley changes demanded by the unions.

Ike's Bill—The second measure was drafted by the Eisenhower Administration and introduced by Sen. Barry M. Goldwater, R., Ariz. This bill, (S. 748) has somewhat tougher clean-up provisions, and also attempts to control picketing and boycott abuses.

The third and toughest proposals are somewhat similar measures sponsored by Sen. John L. McClellan, D., Ark., chairman of the racket-busting Senate investigating committee, and Rep. Graham Barden, D., N. C., chairman of the House Labor Committee. These measures differ in details, but both would establish controls over unions when they attempt to abuse economic powers, by toughening the Taft-Hartley Act.

How They Stand — Sen. Kennedy, as expected, has won handily in all votes on the measure in his committee. The Democratic majority has turned back efforts to substitute the Administration bill. It has rejected efforts to tighten controls over union officials' use of dues money, to remove their tax-exempt status, and to deny them government bargaining sanctions if they violate other provisions of law.

The Senate shows little disposition to start what will be a long and bitter floor debate on the measure until after Easter. In the House, Rep. Barden's committee has been holding hearings, but the measure is not expected to come to the floor until after the Senate acts.

The Outlook — In final form, labor reform legislation this year is likely to be much as it was introduced by Sen. Kennedy and the unions, without the major provisions of either the Administration or McClellan-Barden proposals.

In spite of the hot controversy over the Taft-Hartley amendments,

1959's Union-Management Crisis

In the two years since the McClellan rackets investigating committee threw the spotlight on union corruption, the battle for labor reform laws has been raging in Washington.

The IRON AGE presents this analysis—another in a series on the union-management crisis—to help business men understand the highly-complicated issues involved in the labor-reform controversy.

Title VI of the Kennedy bill (sought by unions) will be included.

Here are details of the three principal labor reform proposals:

Kennedy-Ervin Bill—This bill, aimed primarily at internal union clean-up, is the weakest of the major proposals. It would require detailed financial and administrative reporting by unions, some employers, and labor relations consultants.

An employer or labor relations consultant would be prohibited from making payments to a union representative to gain special treatment. Unions would be required to file detailed reports on trusteeships, and the government would be empowered to enforce secret-ballot elections in trustee locals and prevent diversion of union funds.

It would also require elections for international officers to be held every five years, and for local officers every four years. Elections would have to be by secret ballot or by delegates elected by secret ballot. It would also prohibit loans by employers to unions.

Administration Bill — Provisions of the Administration bill dealing with union trusteeships, secret ballots in elections, financial reporting, and punishment of embezzlement and bribery are similar. This measure also would amend the Taft-Hartley Act provision barring economic strikers from voting, giving the NLRB power to decide. This measure would extend the non-Communist oath requirement to employers wishing to use the NLRB.

McClellan-Barden Bill — This is actually several bills dealing with racketeers in unions and Taft-Hartley Act amendments. It is tougher in both respects than the other two proposals. It would require, in effect, that each union be licensed. Tough and detailed standards for democracy in unions would have to be met to get a license, or certificate of compliance. Without it, a union would lose its tax exemption and its recognition as a bargaining agent.

Do You Know What They Mean?

▪ As the current session of Congress wears on, you'll be hearing a lot more of these terms:

Secondary Boycott—Union pressure to prevent customers, or any third parties, from dealing with a company in dispute with the union. In some cases, unions have put pressure on fourth parties to discourage them from dealing with firms dealing with struck operations.

Blackmail Picketing — Use of professional pickets by a union to force a company or workers in a company to accept the union. It's a show of power to both management and the reluctant workers. This is effective because in many cases members of other unions and sometimes customers — will not cross these picket lines.

Hot Cargo—A form of boycott where a union, through strike threats, succeeds in preventing a trucking firm from handling shipments to or from a struck company.

Trustees—A group of men appointed by a parent union to run a local union in place of officers elected by members. This device has been used by some corrupt unions to take over a local or to establish a "paper" local. It is also used by legitimate parent groups to clean up corrupt locals.

How Proposed Laws Compare

	Kennedy-Ervin	Administration	McClellan-Barden
Internal Union Problems			
Require Secret Ballots	Yes	Yes	Yes
Tighten Financial Reporting	Yes	Yes	Yes
Curb Embezzlement	Yes	Yes	Yes
Tighten Control of Management	Yes	Yes	Yes
Control Trusteeships	Yes	Yes	Yes
Prohibit Racketeer Officers	Yes	Yes	Yes
Require Certificate of Compliance	No	No	Yes
Economic Problems			
Extend Unionization to Supervisors	Yes	No	No
Curb Blackmail Picketing	No	Yes	Yes
Tighten Hot Cargo Controls	No	No	Yes
Permit Economic Strikers to Vote	Yes	Yes	Yes
Prohibit Extortion	Yes	Yes	Yes

Market for Locomotives Revives

Demand for Diesels May Reach Boom Levels By 1963

For the locomotive builders the lean years look to be just about over.

The prospect: A rising replacement market in the U. S., coupled with expanding sales overseas.—By G. G. Carr.

▪ After some lean years locomotive makers are getting set for a sales feast.

They point out these bright prospects: The replacement market is improving, should be highballing along by 1963. Buyers then should be ordering from 1200 to 1300 units a year, with some estimates going as high as 1900 units a year.

This would mean an annual sales volume of $225 to $250 million, according to General Electric's Locomotive and Car Equipment Dept. at Erie, Pa.

Even Better Overseas—The export market is also attractive. Total potential overseas market will be $5 billion or more. A big factor will be replacement of steam locomotives in the world market. Between 40,000 and 50,000 units may be bought. And this does not include European and Iron Curtain countries, whose domestic facilities rule them out as customers.

Least promising is the industrial locomotive market. Reason: Plant owners keep patching up rolling stock long after its expected replacement date.

Good News for Metals—Metalworking's share in the coming locomotive boom will be sizable. About 25 pct of the sales price of each locomotive represents metals and metals products. Engine builders should be spending about $62.5 million on this hardware for their domestic orders by 1963. And the export market will require about the same level of spending. Combined total for both markets should be $125 million a year.

By 1963 steel consumption should run at least 2000 tons a month.

What They Want—What are the main trends in locomotive design? The big market is for large, high-horsepower diesel-electrics — those well over 1000 hp. Steam is virtually extinct on Class I roads, there are only about 1000 left, and half of them are sitting cold on sidings.

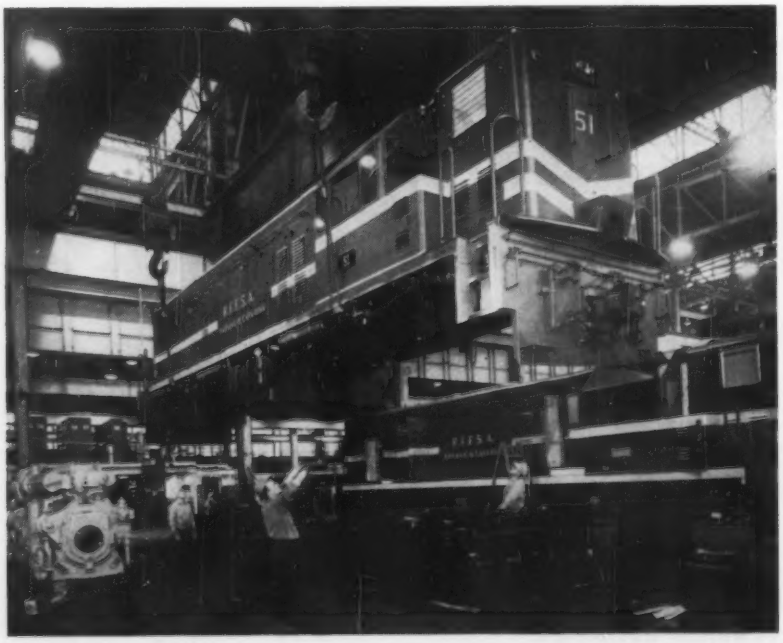
Switch engines are also vanishing. The trend today is to use over-the-road locomotives for all work. Improved cab design makes it easier to use the bigger engines for yard duty between trips, while current railroad policy is to keep equipment in use as long as possible.

Other Than Diesel—Domestically, diesels are the overwhelming choice. Horsepower continues to go up, with new 2400-hp units very popular. Gas turbines have generally proved too expensive for general use. However one Farwest railroad has had 25 turbine units of 4500-hp in use for several years.

GE delivered five large 8500-hp engines to the same road last year, is now building three more. But they are feasible only when, as in this case, the road has special physical and traffic patterns plus arrangements to get oil at a very low price.

The coal-fired turbine is a possibility for the future. Research on it looks very promising at the moment, but is far from complete. The much-discussed atomic-powered locomotive is now considered dead, principally because of the problems of shielding.

Really cheap electric power from nuclear sources may spur electrification. But it's 10 to 20 years away, says GE.



OUTWARD BOUND: Workers at GE's Locomotive and Car Equipment Dept. put finishing touches on new locomotive ordered for use in Brazil.

Committee Urges Cut In Foreign Aid

Walter Harnischfeger, president of Harnischfeger Corp., Milwaukee, fired an opening round at the $4 billion foreign aid budget Monday.

As chairman of the Citizens Foreign Aid Committee, Mr. Harnischfeger urged that foreign aid be cut to $1.9 billion from the $3.9 billion requested by the Administration. The $2 billion savings would be applied to reducing the national debt. The Committee is further recommending that U. S. foreign aid be ended in the next 3 years.

[President Eisenhower is warning that his request for almost $4 billion for foreign aid in the new fiscal year may not be enough if the European crisis worsens.

The President says that Russia's threats in Europe may force an increase in the $1.6 billion he has asked for military aid in the fiscal year beginning July 1.

The $4 billion total he is asking, he says, is a minimum program to prevent serious deterioration of the Free World defense system.]

Inflation Cited—Answering arguments that 80 pct of foreign aid dollars are spent in the U. S. and provide employment for 600,000 workers—Mr. Harnischfeger's committee points out that we've granted $96.3 million for foreign textile aid. Only $7.2 million was spent in the U. S. After 10 years of foreign aid, the Committee says, we have 5 million unemployed and a badly inflated dollar.

Foreign aid, the Committee believes, consumes the equivalent of 20 pct of U. S. personal income tax.

U. S. Debt Climbs — With the sole exception of Germany, the Committee finds, every nation that has received U. S. aid in the past 10 years has a softer currency than in pre-foreign aid days. At least $3 billion has been granted foreign nations to reduce their national debt, even though the U. S. debt continues to climb.

Turbine Imports Hit

▪ An aroused electrical equipment industry is protesting increased purchases by federal agencies of foreign-made heavy power apparatus.

Speaking through the National Security Committee of the National Electrical Manufacturers Assn., the domestic producers warn that this practice "presents a threat to the security of the U. S. in time of crisis."

Protection Wanted—Petitions of protest have been filed by NEMA and General Electric Co. with the Director of Civil and Defense Mobilization, who has the power to halt further purchases in the interest of national security.

The petitions call for restrictions on foreign purchases of four classes of heavy power equipment: Hydraulic turbines, hydraulic turbine-driven generators, heavy power transformers, and large circuit breakers.

The List Is Long—As an example, the annual share of federal heavy power transformer orders going to overseas companies rose from 27 pct in 1952 to 80 pct in 1956, NEMA points out.

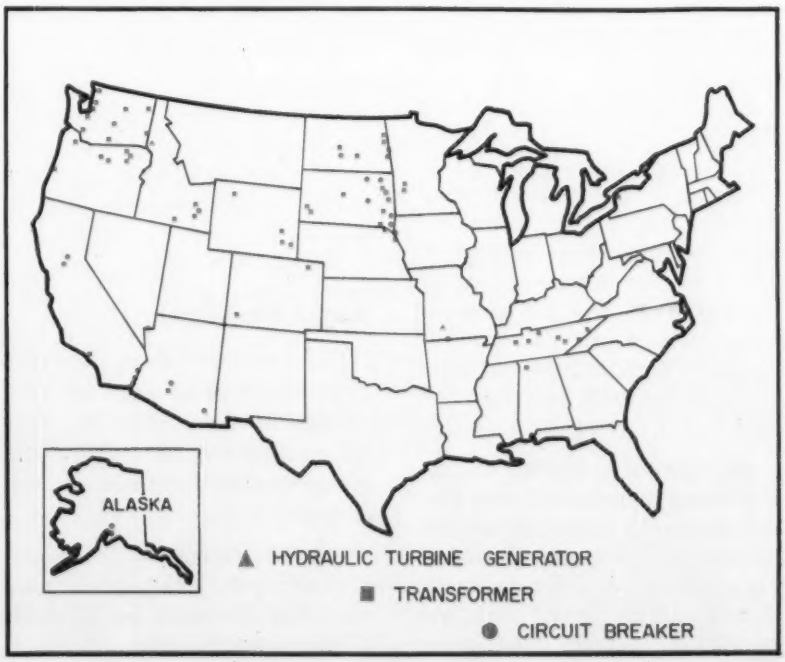
A list of equipment purchased abroad by U. S. agencies includes 358 transformers, 81 power circuit breakers, 24 generators, and 10 hydraulic turbines, NEMA reports (see map below).

U. S. Buys Most—"This growing dependency on foreign sources threatens this nation's ability to maintain adequate and continuous supply of electric power in time of national emergency," said F. J. Miller, NEMA managing director.

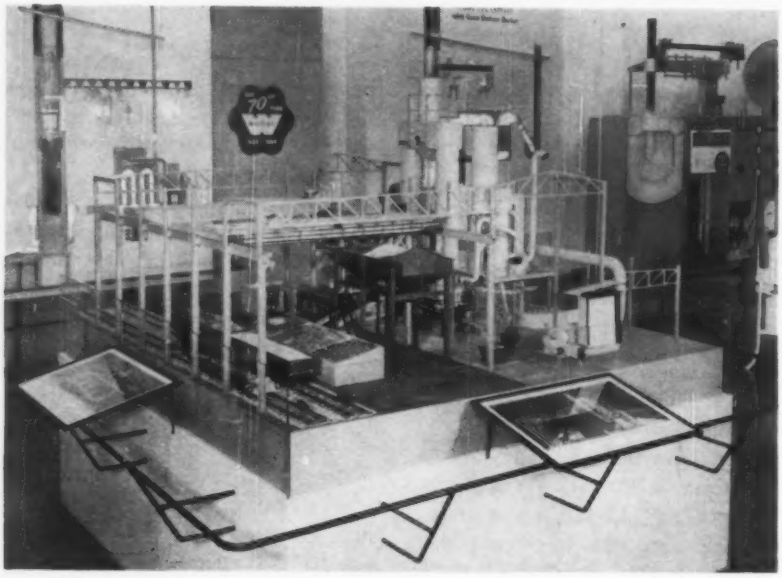
The market for these products is small, the domestic producers say. The federal government accounts for almost 60 pct of the annual domestic purchases of hydraulic turbines and generators.

The value of one contract may be equivalent to 40 pct of the average annual bookings of the entire industry.

Where Imported Equipment Is Located



Model Cast in Training Role



EIGHT-FOOT MODEL—An exact scale model, one-half inch to the foot, of an up-to-date foundry helps train foundry technicians at the University of Illinois, Chicago. It was donated by Whiting Corp., Harvey, Ill., makers of foundry and other heavy industrial equipment.

The model's melting equipment is two hot-blast cupolas fitted with dust suppression facilities, and a hydro-arc electric furnace.

Don't Blame Profits Says U. S. Steel

The view voiced by some labor leaders that corporate profits rather than cost-push wage inflation are responsible for price inflation ignores recorded facts, says U. S. Steel Corp.

In its annual report for 1958, the Corporation points out that our net national product was $179 billion higher last year than it was in 1947. About $125 billion was higher employe compensation, $27 billion was due to higher taxes, and $27 billion the increased income of unincorporated enterprises. But corporate profits in 1958 were about the same as 1947, says the U. S. Steel report.

Big Spender — The big mistake, says the steel producer, is that some people consider the income not paid out in dividends a pool of purchasing power siphoned off the economy that should be forced back into circulation. Actually, the report says, this purchasing power has usually been expended by the time it is calculated.

Production, shipments and employment at U. S. Steel were all off in 1958. Production of ingot and castings dropped to 23.8 million tons, lowest since 1946.

With Less Money — Income dropped to $301.5 million from $419.4 million in 1957. And shipments tailed off to 17 million tons from 23.4 million tons the previous year.

Right-to-Work

Union officials believe there will be a standoff in the states this year on right-to-work. AFL-CIO brass figure neither they nor the advocates of the open-shop will win any new contests.

Why No Change — The Republican rout at the polls last November has taken the starch out of much of the backing for new state right-to-work laws. And the unions aren't pushing too hard in light of the scandals still cropping up in some major unions.

Insiders report labor leaders believe the best way to beat the right-to-work issue is at the federal level by inserting an amendment in any labor bill repealing the section of Taft-Hartley Act which sanctions such state laws.

NASA Will Develop The Economy Rocket

Project Scout, the civilian space authority's new economy rocket, will fit into a number of space research programs.

An Air Force-NASA agreement provides the latter will handle the basic work on the four-stage, solid propellant vehicle and give the Air Force copies of its specifications. An Air Force contractor will design modifications needed for Air Force experiments.

Wire Tariff Ruling

The U. S. Tariff Commission turned thumbs down on application by four domestic wire products producers for protection from foreign competition (The IRON AGE, March 12, 1959, P. 85).

The Commission ruled that the domestic firms failed to prove injury by imports of nails, spikes, galvanized fencing, etc.

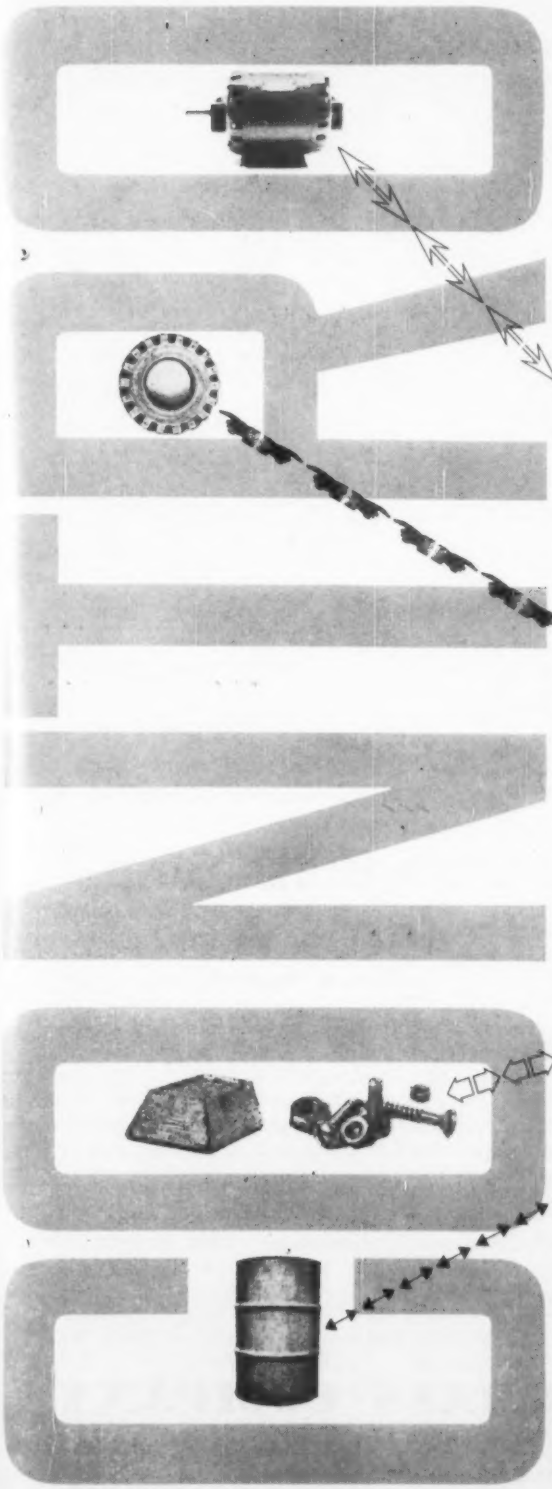
Steel Shipments

Shipments of finished steel products from U. S. mills were up 12 pct in January over the previous month. The American Iron and Steel Institute puts the total at 6,186,168 net tons.

Auto buyers took 1,458,737 tons, or about 24 pct of the total. This was up about 10 pct over December 1958.

Cold-rolled sheets accounted for 1,338,906 tons, the highest level since December 1955. This was up seven pct over the previous month.

INVENTORY



PUT YOURSELF IN FULL COMMAND OF INVENTORY WITH IBM DATA PROCESSING

What do we have on hand? What are our immediate needs? What will we need in the future? When do we reorder?

With new IBM inventory control methods, you not only answer questions like these precisely, but you also keep inventories at optimum levels . . . reduce shortages . . . cut inventory carrying charges . . . get automatic calculation of materials requirements and ordering quantities.

Results of such control? One manufacturer cut a 24-day inventory reporting cycle down to 24 hours with an IBM 650. Another realized substantial savings by cutting his inventory investment in half with an IBM RAMAC® 305.

COMPLETE MANUFACTURING CONTROL

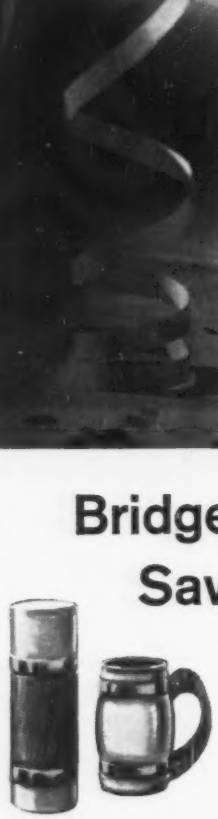
Not in inventory control alone—but in every area of manufacturing—from machine scheduling to market forecasting, from engineering planning to cost analysis, new IBM techniques are revolutionizing management control of manufacturing. In scores of companies, IBM data processing systems are supplying information once impossible to obtain . . . closing the time lag between fact and report . . . and reducing the over-all costs of production.

All these benefits can be brought to your business, too, with methods drawn from IBM's many years of experience.

For all the facts on IBM Data Processing, and complete details on IBM Inventory and Manufacturing Control Methods, call your local IBM representative.

IBM®
DATA PROCESSING

Bridgeport Ultra Fine Grain Brass Strip Saves Siesta-Ware $2,400 a Year



Colorful Siesta-Ware is designed to create a holiday mood ...and so are the remarkable production savings realized by Benner Glass Company!

Before Benner Glass Company, Jacksonville, Fla., made the happy discovery of Bridgeport Ultra Fine Grain Brass Strip, production of the brass banding on each attractive Siesta-Ware Party Mug, Snack Jar and Tumbler was at the rate of two coils of strip running at 35 lineal fpm through three buffing stages. Today, with Bridgeport UFG Strip, the same machine runs *at the rate of 48 fpm!*

There's a simple reason why Benner Glass now realizes 23% time savings and 8% savings on polishing materials. It is this: the infinitely superior finish of Bridgeport Ultra Fine Grain Strip requires far less buffing. Important savings in time, cutting compound and buffing naturally result. In the annual processing of Bridgeport coiled strip, Benner saves more than $2,400...while turning out an even better finished product!

Don't *you* overlook the sizable savings that can be yours when you switch to Bridgeport Ultra Fine Grain Brass Strip. To get the facts and figures as they apply to your products, call *your* nearby Bridgeport Sales Office...or write direct for a copy of our Ultra Fine Grain Brass Booklet, GRAIN SIZE, THE FOURTH DIMENSION. Dept. 3403.

BRASS Bridgeport CO.

BRIDGEPORT BRASS COMPANY

BRIDGEPORT 2, CONNECTICUT

Specialists in Metals from **A***luminum to* **Z***irconium*

Newman Marsilius, Jr.

A Tool Builder Talks Politics

Does it pay for a business man to become involved in politics?

For the past 10 years, Mr. Marsilius has been involved. Here is his experience.

NEWMAN MARSILIUS, JR.: The need is great for better understanding.

▪ All the talk about business men and their duty to take part in politics is old hat to Newman Marsilius, Jr., president, Producto Machine Co.

At 40, he is a veteran of five political campaigns—two of which earned him a Republican seat in the Connecticut House of Representatives and two more as state senator.

The Ups and Downs — Politics, like the machine tool business, can be tough and unpredictable, Mr. Marsilius finds. Last November he lost out in the Democratic landslide that swept Connecticut, as it did many other parts of the nation.

Mr. Marsilius takes the loss philosophically. Nobody in the machine tool business today is apt to be discouraged by one setback.

His Company Grows—A decade ago, when many business men feared to tread into the political arena because "it might hurt business," Mr. Marsilius hesitated not a bit. During these years he and his brother, Philip, executive vice president, expanded Producto from a regional to a national producer of special machine tools and die sets.

"The need is great for better understanding by business men of the problems of government," Mr. Marsilius says. "Only by being a part of it can a business man fully grasp the difficulties faced by legislative bodies."

It's unfortunate, he adds, that executives can't play a greater role in government. "Today's competition often demands one's undivided attention. And for the non-owner of a business there is the risk to his own position in the company in devoting time to political activity."

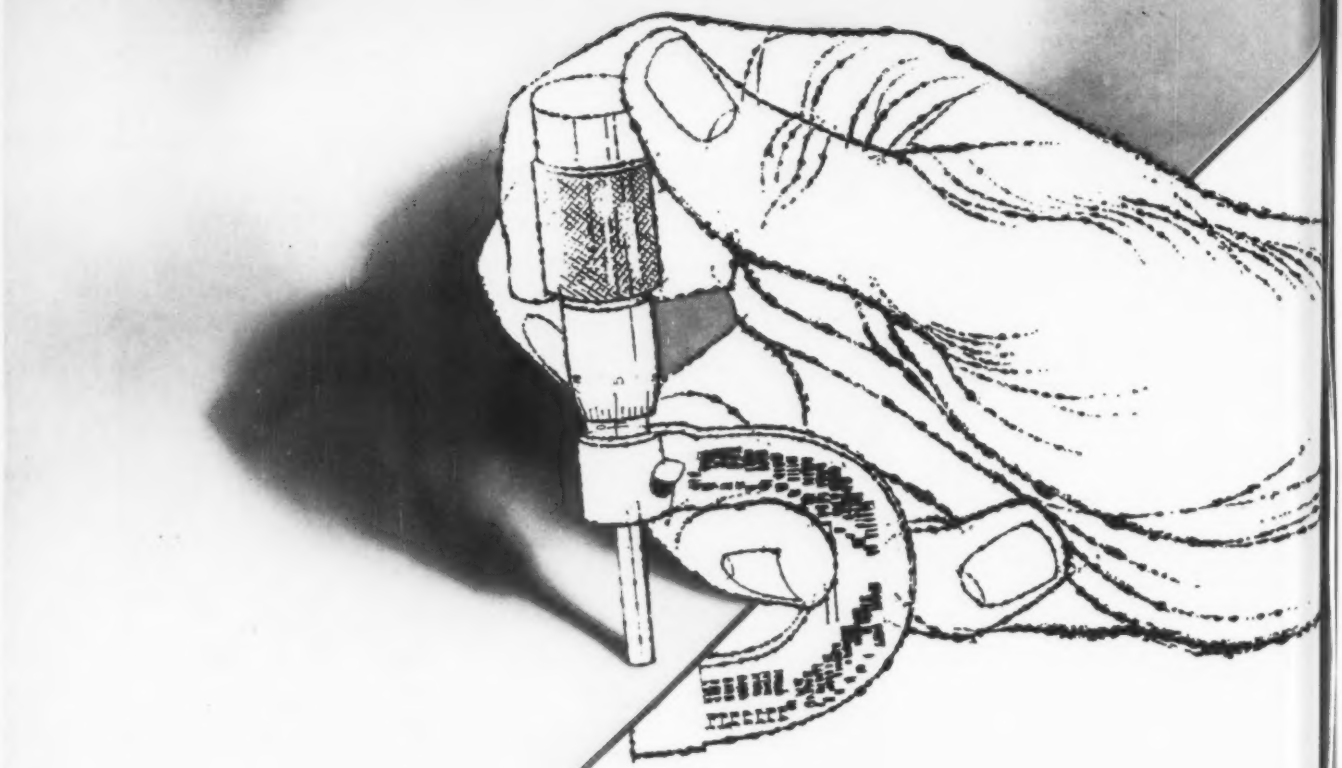
Learning the Ropes—Mr. Marsilius grew up under the guiding principles of a father (the late Newman "Cap" Marsilius) who placed great faith in the power of education coupled with plain, hard work.

Newman Jr. was graduated from Massachusetts Institute of Technology with a master's degree in mechanical engineering in 1942—just in time to join the Army after Pearl Harbor.

By the end of the war he was wearing the insignia of a lieutenant colonel in the Ordnance Corps. He had taken part in the African-Middle East and the China-Burma-India campaigns.

Active in Bridgeport—Newman Marsilius has taken upon his shoulders a number of other responsibilities that would make a less public-spirited man stagger. He is vice president and director of the Bridgeport, Conn., YMCA; director of a hospital, director of the Bridgeport Chamber of Commerce and the local manufacturers assn.

Even so, he finds time for an active family life with his wife and four children.



J&L COLD ROLLED SPRING STEELS PRECISION INSIDE AND OUTSIDE

INSIDE—Microstructure control through processing techniques developed by J&L offers important advantages. For example, improved stamping, forming and drawing qualities; uniform response to heat treatment; reduction of heat treating distortion. This product is available in various internal structures and is also available in all hardness ranges—dead soft, intermediate and spring tempers.

OUTSIDE—Superior gauge accuracy of J&L precision spring steels made possible by specially developed rolling mill equipment and techniques, saves production dollars. For example, elimination of grinding for gauge accuracy; lower inspection costs; longer tool life; smoother surface finishes.

Investigate the cost-saving possibilities offered by J&L cold rolled spring steels. Contact J&L Stainless and Strip Division, Youngstown 1, Ohio.

J&L STRIP

LOW CARBON • HIGH CARBON • ALLOY • STAINLESS
TEMPERED SPRING STEEL • ZINC AND COPPER COATED

Plants and Service Centers:
Los Angeles • Kenilworth • (N. J.) • Indianapolis • Youngstown

Jones & Laughlin Steel Corporation • STAINLESS and STRIP DIVISION • Youngstown 1, O

Is the Recovery "Watered?"

Some businessmen fear there is an artificial quality about the extent of the business recovery.

The feeling is that the rate of industrial production may not be justified by consumer buying.

▪ More businessmen are wondering out loud just how much "water" is present in the economy today.

They tend to feel that while many indicators are flirting with record highs, business really isn't that good. The result is a feeling of uneasiness among many top people.

Reasons Why — So far, there isn't much evidence of retrenching. Most are still gearing their plans to further gains in business throughout the year and into 1960. But they have a few qualms, and more today than a month ago.

Reasons for the uneasy feelings are not hard to pin down. They follow a general pattern related to steel, auto sales, and continued high unemployment.

In steel, many executives are wondering how soon the cut-off point in inventory rebuilding will be reached. There isn't too much fear of overbuilding yet. Most are frankly skeptical of the "no-strike" propaganda that is being handed out, mostly from Washington. They can't see much basis for discounting a strike threat, but they do wonder how much of the strong steel demand is artificial.

Autos and Unemployment—Auto sales, while better than a year ago, are nothing to base big hopes on. Then, there is some concern over what the impact of the new small cars may be. There is less and less talk about a 5.5 million year.

On unemployment, businessmen keep telling themselves that consumer income is up. But most are old-fashioned enough to be skeptical of a business upsurge that leaves 4.7 million potential consumers out of work—and therefore out of the market for all but bare essentials.

Added Buoyancy—It's probably true that there is some water in the economy today. But business is strong enough to show a pretty good level without the added buoyancy of a slightly inflated steel demand, if it is.

An improvement in capital spending could take care of this.

It will be a relief to most businessmen when the steel hassle is cleared up. Only then will they know where they stand on inventories, sales and orders. Until then, some uncertainty is natural.

However, consumer demand is improving and corporate profits are headed for close to the record. The Administration is betting on $47 billion and some optimists look for $50 billion. Even with some water, continued but cautious optimism is justified.

Buying Plans Pick Up Moderately

▪ One reason not to go overboard is the unpredictable consumer. As yet, the recovery hasn't generated any major surge of buyer optimism.

Preliminary findings of the Federal Reserve Board's Survey of Consumer Finances shows some reason for encouragement. Generally, the consumer has more money this year, and is confident he will be making more before the year is over.

Like 1955?—This should come as no surprise. A year ago, consumer attitudes were at the lowest point since early 1951, according to the survey. (It's conducted for the FRB by the Survey Research Center of the University of Michigan.)

Year to year comparisons can be misleading, but there is a strong parallel between findings for early this year and early 1955.

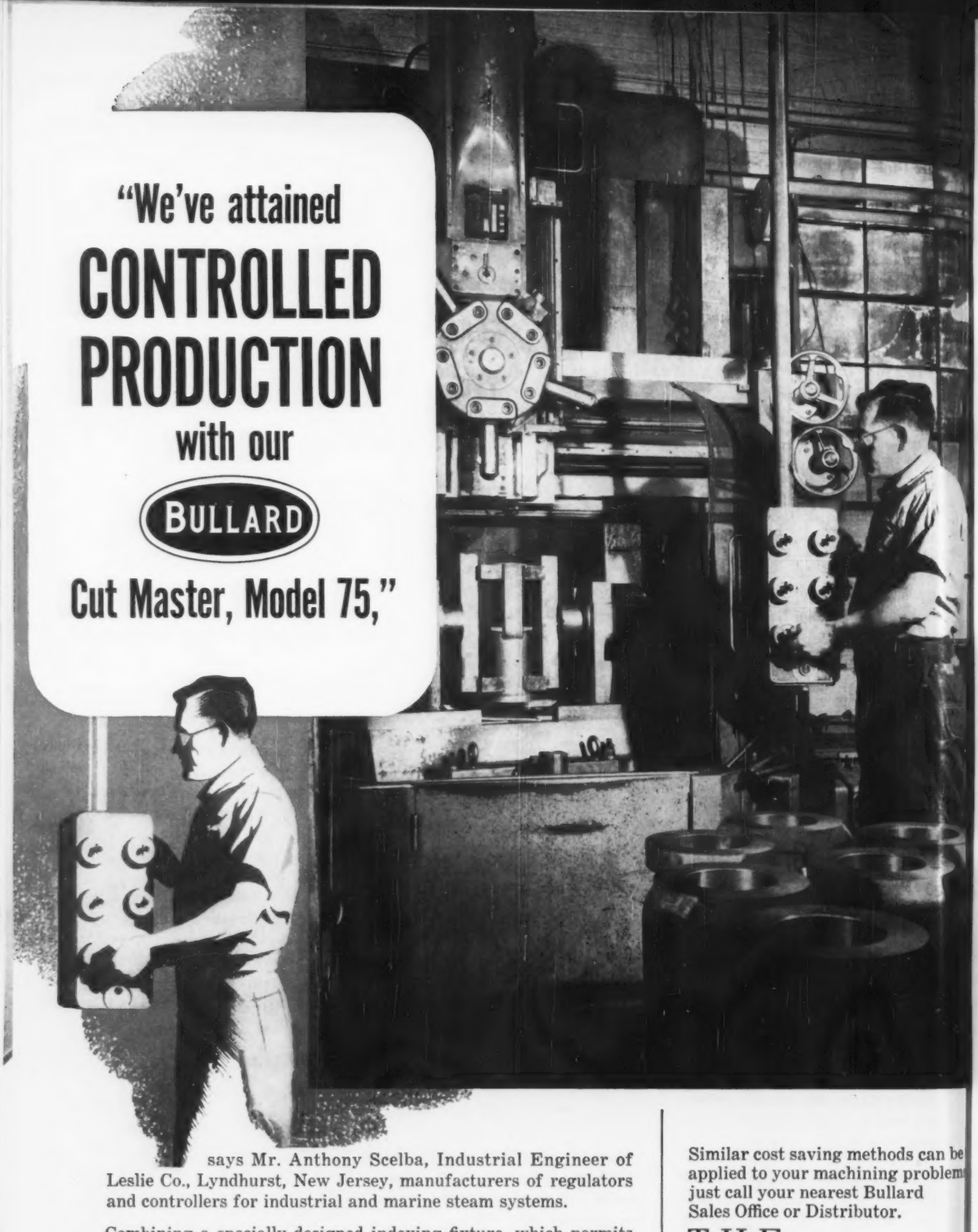
Percentages are very close between the two years on questions relating to financial position, size of liquid asset, plans to purchase houses and durable goods.

Mild Improvement — The major difference in purchase plans is in automobiles. In record-breaking 1955, 8.2 pct planned to buy a new car. This year, only 7.6 pct do. Last year, a mere 6.9 indicated new car plans.

The survey shows, however, that except for a substantial rise in plans to buy new houses this year, buying plans are only moderately above a year ago. And average planned expenditure declined slightly.

This indicates that buyers intend to be more cautious. Nearly four out of ten are better off financially than a year ago, compared with one in three a year ago. And they are more optimistic about business conditions for the coming year. About 40 pct are confident their earnings will improve during the year.

In the past, actual spending had tended to outstrip consumers' stated intentions.



"We've attained CONTROLLED PRODUCTION with our BULLARD Cut Master, Model 75,"

says Mr. Anthony Scelba, Industrial Engineer of Leslie Co., Lyndhurst, New Jersey, manufacturers of regulators and controllers for industrial and marine steam systems.

Combining a specially designed indexing fixture, which permits indexing the piece in increments of 45° and with the automatic features of Cut Master, every piece leaving the machine is completely finished on all surfaces. This reduces the number of set-ups, for instance, on a four way valve from four set-ups to one. In this manner, production is controlled and a minimum inventory required.

Similar cost saving methods can be applied to your machining problems just call your nearest Bullard Sales Office or Distributor.

THE BULLARD COMPANY
BRIDGEPORT 9, CONNECTICUT

'Big 3' Tool Up for Small Cars

Chevrolet Model Should Be First Out in Fall

Detroit is no longer able to clamp the lid shut on its new, small car plans.

A lot of tool work has already been completed. Steel is on order.—By H. R. Neal.

▪ A day after Chrysler Corp. President L. L. Colbert said his company's approach to light car production plans are "if they do, we will," Ford Motor Co. revealed "it will."

In Ford's annual report, Board Chairman Ernest R. Breech and President Henry Ford II gave the auto industry's first official affirmation that smaller cars are just months away.

Backtracking Unlikely—"Barring changes in the market or other circumstances, the company plans to introduce such a car during the 1960 model year. If introduced, the car will be in competition with other economy cars, including cars expected to be produced in this country by other American manufacturers."

Chrysler spokesmen said Mr. Colbert is standing by his day-earlier statement: "We haven't made a decision yet and I don't think our competitors have either. We don't want to be the fair-haired boys and be first, but we'll come right along with them."

Decided Months Ago — He pointed out Chrysler has a small car it could release for production and has prototypes on the test track now. However, he said, the "point-of-no-return is late summer.

But the decisions by the Big Three were actually made months ago. Despite a crash program, Chrysler is still behind Chevrolet and Ford. Chrysler's aim is to have its car in production not too far behind the other two.

Tooling in Progress — Much of the tool work in connection with light cars has already been completed. Dies have been let, some even completed and installed. Orders for steel have been placed, including stainless for trim, by the Big Three for their lighter cars.

According to industry sources Chevrolet will begin production in September, introduce the car in October. Ford production will get underway in October, with public introduction slated for late November or early December. Chrysler isn't expected to introduce its entry until next January.

One-Piece Bodies—Unitized construction will be employed for all of these small cars. Bodies will be modern, but not radical, and will be available in sedan and station wagon models. They will offer many of the same extra cost features found in the full size cars —automatic transmissions, power accessories, etc. Suspensions will be similar to those currently being em-

Future Engineers Learn How It's Done

SCALED-DOWN MERCURY: Prof. Fred Guillermety of Detroit Institute of Technology shows students how an auto body is assembled. The ⅜ scale model was donated by Mercury in interest of engineering education.

ployed on each company's large cars.

Chevrolet will offer the most unconventional vehicle of the three with its rear engine drive. Wheelbase is 108 in., same as American Motors' Ramblers. The engine is a six-cylinder, air-cooled, horizontal-opposed piston engine of 141 cu. in. displacement. Horsepower is 90 plus.

Production Target Set—It has an aluminum block with cast iron sleeves. At least initially, permanent mold process will be used in casting the block at GM's new foundry at Massena, N. Y. Engine assembly will take place 300 mi. further West at Chevrolet's Tonawanda, N. Y., engine plant. Production is expected to be 75 to 80 engines per hour.

The car will be assembled at the rate of 700 per day at Chevy's expanded former truck plant at Willow Run, Mich., while up to 200 more will be assembled at Van Nuys, Calif. A Kansas City assembly plant could be pressed into service later, if volume warrants it.

Beyond 1960 — GM also has a second light car in the works, but not for immediate introduction. A slightly enlarged version of the light Chevy, it is planned for distribution by Buick, Oldsmobile and Pontiac dealers—but probably as a 1961 model.

There is talk there would be minor appearance variations for each of the B-O-P divisions.

In the Ford Camp—Ford, too, is well along with its plans and has eased some of the overtime connected with the programs. Some dies and tooling have been delivered, and the rest is on schedule.

Production kinks are being ironed out on the miniature production line at Ford's new Quality Control Center. One problem: One source indicates the car is about 150 lb over design weight.

Block Is Cast Iron—Unlike the Chevrolet model, the 107-in. wheelbase light Ford has a very conventional drive line with the engine in the front. Engines will be built at the new Lima, O., engine plant.

Automotive Production

WEEK ENDING	CARS	TRUCKS
Mar. 14, 1959	131,096	24,422
Mar. 6, 1959	133,540	23,492
Mar. 15, 1958	86,447	16,952
Mar. 8, 1958	83,892	17,523
TO DATE 1959*	1,288,876	245,705
TO DATE 1958	1,051,865	190,261

*Preliminary Source: Ward's Reports

Assembly will be at Lorain, O., and San Jose, Calif., reportedly split 780 and 200 units per day.

While the powerplant, a six-cylinder, in-line overhead valve with 144 cu in. displacement producing about 90 hp, is new, it has a cast iron block.

Edsel Overtones—Ford is readying a 114-in. wheelbase light car for introduction as a 1961 model by the M-E-L division. The company hopes to have its aluminum engine ready for this car. Project name is Edsel "B".

While this normally wouldn't mean much (the smaller car's project name is XK Thunderbird), the full-size Edsel is the only one of Ford's 1961 cars that hasn't been scheduled.

25 Miles a Gallon—Heavy overtime schedules will help Chrysler get its 106 in. wheelbase car into production in time for a January introduction. The later introduction date will help efforts to have an aluminum block available in time. Block will be cast in Kokomo, Ind., and the engine assembled in Trenton, Mich.

The largest of the three engines, 170 cu. in., it is also the most powerful with about 100 hp. It will be located "up in front where an engine belongs," according to Chrysler's Mr. Colbert. He says it will give 25 mpg—the goal of the automakers for their light cars.

Then There's Costs — Development of the light cars has already cost the automakers plenty of money—but not nearly so much as the hundreds of millions of dollars they claim for the annual changes to their larger cars.

The Bull of the Woods

HEY, GUY, THAT AIN'T A BLACK CAT! WE JUS' BEEN PETTIN' HIM TOO MUCH AROUND HERE!
2020
2021
MECHANIC'S TAN
© 1959 by NEA Service, Inc. T.M. Reg. U.S. Pat. Off.

INTRICATE SHAPES, PRECISELY FORMED IN

2 TO 10 MILLISECONDS

By DYNAPAK, a breakthrough in high-energy-rate metal working equipment

Pneumatically energized DYNAPAK, industry's first high-energy-rate machine tool, has produced the shapes pictured here, and many others of equal intricacy. DYNAPAK is equally applicable to extrusion, forging, forming, or compaction. DYNAPAK offers energy outputs from 40,000 to 1,500,000 foot-pounds – tool speeds to 2500 inches per second, controllable to ±12 inches per second. Elapsed time from billet to finished piece, 2 to 10 milliseconds, is so brief as to minimize heat transfer to the die – permits working metal at temperatures to 3500°F – yields longer die life.

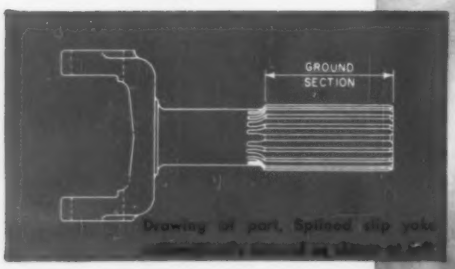
DYNAPAK requires no separate pneumatic power source...DYNAPAK is easily installed, horizontally or vertically...DYNAPAK produces smooth surface finishes, radii to .003", webs to .010", fins to .010"; forges to near-zero draft angle. Evaluate DYNAPAK for your metal working problems. Write, wire or phone.

DYNAPAK

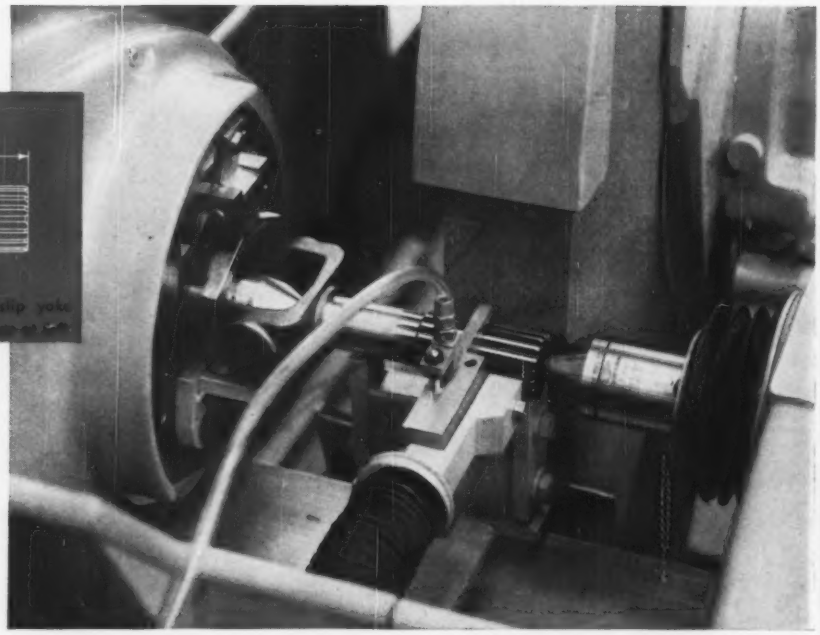
CONVAIR, A DIVISION OF GENERAL DYNAMICS CORPORATION

1243 Transit Avenue, Pomona, California · Phone NAtional 9-1109

CINCINNATI keeps these tough grinding jobs under control



Drawing of part, Splined slip yoke



Horizontally mounted Air-Electric Gage Sizing Equipment, on CINCINNATI FILMATIC 10"R Plain Grinder, keeps size and production under control. Operation performed—grinding spline section of automotive splined slip yoke.

Cycle Time Stabilizer automatically compensates for wheel wear

Spline sections and other cutaway diameters are tough on grinding wheels. Ordinarily, frequent adjustments for size and/or length of infeed cycle are required. Cincinnati cures these ills of rapid wheel wear with Automatic Air-Electric Gage Sizing. An exclusive extra advantage of this equipment, Cycle Time Stabilizer, does the trick. It automatically adjusts the length of infeed cycle to compensate for wheel wear and truing. Cycle time cannot increase; rate of production cannot decrease. ¶A horizontally mounted variation of Automatic Air-Electric Gage Sizing is incorporated in the CINCINNATI FILMATIC 10"R Plain Grinder abbreviated in the illustration above. Other automatic features which help to keep the cost of production at a minimum include:

Push-button Automatic Dual Rate Infeed
Behind-the-wheel Truing with Cycle Counter
Automatic Positioning of Headstock Spindle Gap Eliminator
Flat top table, work cradles, and hydraulic footstock

Write for catalog Nos. G-660-2 and G-661-1. Sweet's Machine Tool File contains brief specs.

CINCINNATI FILMATIC 10"R Plain Hydraulic Grinding Machine. Range and sizes listed below.

Size	Between-Center Lengths	Catalog
6"R } 10"L }	18" and 30"	G-660-2
10"R } 14"L }	18", 36", 48" 72" and 96"	G-661-1

GRINDING MACHINE DIVISION
The Cincinnati Milling Machine Co.
Cincinnati 9, Ohio

CINCINNATI®

CENTERTYPE GRINDING MACHINES · CENTERLESS GRINDING MACHINES
MICRO-CENTRIC GRINDING MACHINES · CHUCKING GRINDERS
ROLL GRINDING MACHINES · CENTERLESS LAPPING MACHINES

Rift Between Ike and Military

Admirals, Generals Want More Defense Spending

Military leaders say the President's thrift will threaten our national security.

Democrats in Congress will try to drive the wedge in even further.—By G. H. Baker.

▪ The Eisenhower Administration is openly split on defense spending.

Top military leaders now widely disagree with Ike over the size of their budgets for the year starting July 1. What's more, they are making no attempt to conceal their contempt for the "small sums" proposed for their operations.

Happy to Hear It—Such disharmony is sweet music to the ears of Democrats in both the Senate and the House. The rift between Ike and his military leaders over money is being exploited fully on the floors of Congress. Democrats are capitalizing on the discussion by siding with the generals and admirals.

Senate Majority Leader Lyndon B. Johnson is chiefly responsible for showing up the bickering between Ike and his military chiefs. Johnson asked the heads of the Army, Navy, Air Force, and Marine Corps if they believe Ike's military budget for the new fiscal year will buy the nation all the defense it needs. All four answered "no."

Penny-Wise—Without criticizing their commander-in-chief by name, they all implied the new budget is a "cheapskate" budget as far as they are concerned. Each demanded more money. Here is the gist of their response, as released by Senator Johnson:

Gen. Maxwell D. Taylor, Army Chief of Staff: Not enough manpower is budgeted to meet assigned missions. Also, not enough money for Nike-Zeus anti-missile missiles is being asked; not enough for anti-aircraft missiles.

Admiral Arleigh Burke, Chief of Naval Operations: We want more funds to modernize more ships and planes. Polaris (missile fired from submarine) should have more. Need more dollars to buy weapons, to expand research, and to perfect anti-submarine defense.

Gen. Thomas D. White, Air Force Chief of Staff: We should have more money to replace B-47 medium jet bombers with the new B-58 supersonic bombers. Further, we want more funds for a nuclear aircraft, for Bomarc anti-aircraft missiles.

Gen. Randolph M. Pate, Marine Corps Commandant: Wants more Marines, planes, ships, and related equipment. Ike is thinking in terms of a 175,000-men Marine Corps, but Pate says 200,000 is the least he'll settle for.

All four justify their positions opposed to their commander-in-chief as "necessary" to national defense. Of course, it's traditional for military leaders to want more of just about everything.

This opposition is privately infuriating to Ike. But there's little he can do about it. Actually, gleeful Democrats are talking of voting the military men a large part of the extra funds they ask. They've got the votes, and may try to show up Ike as an "inept" commander-in-chief.

Ike Answers His Critics

Immovable Object—Eisenhower is boiling over the defense money hassle. Demands from Democrats for more military spending are making him more firmly determined not to be pushed into a massive boost in military spending. Here's how he answers his critics:

To charges that he is sacrificing adequate defense for a balanced budget, he insists the two cannot be separated.

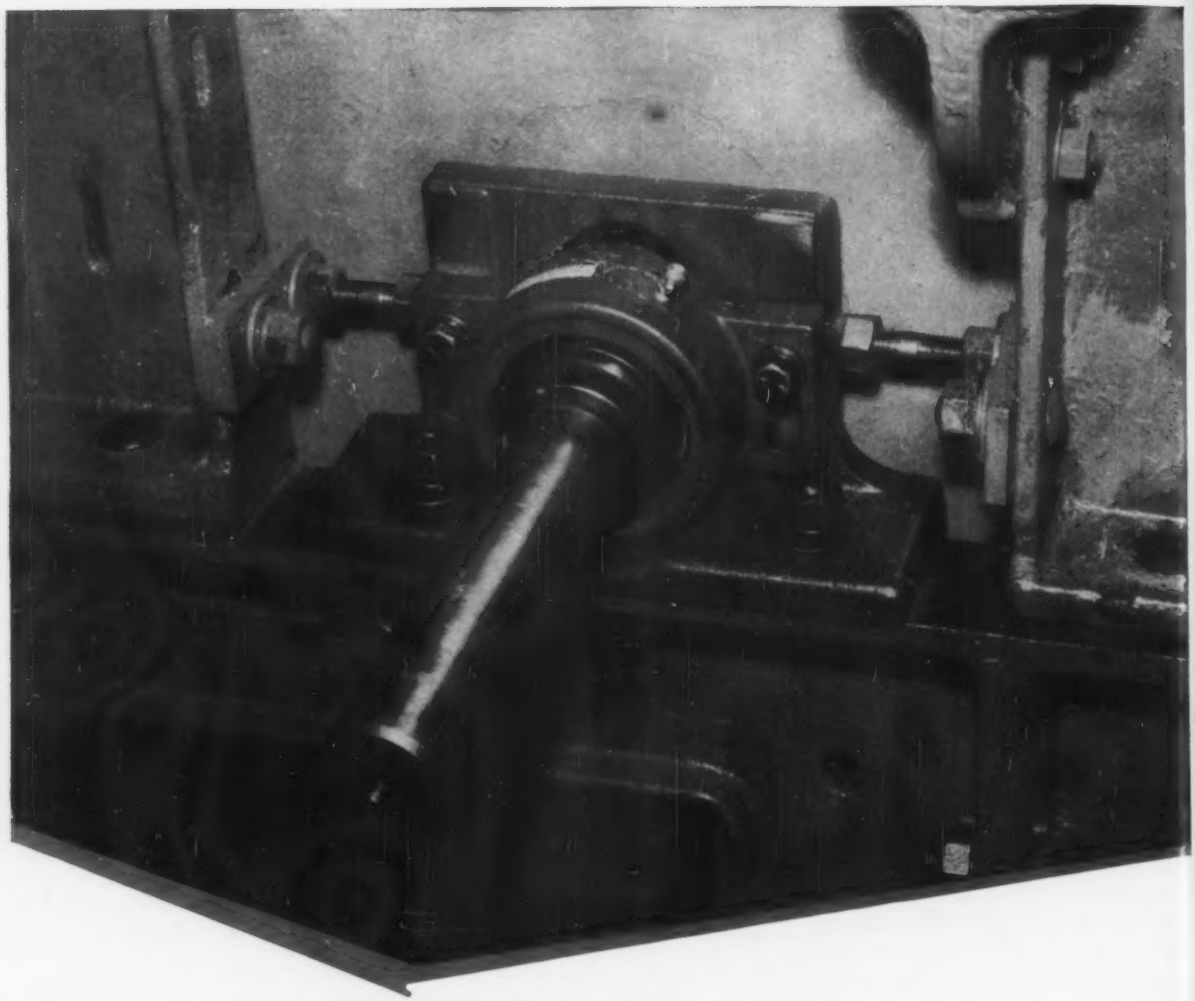
A strong domestic economy is a vital part of national defense, he says, adding that we will be in serious straits if we permit the Reds to force us into overspending. The Communists have long claimed we will spend ourselves out of existence.

To demands that military manpower be boosted not cut, he says flatly that more troops would not be the answer to Russia's tremendous manpower.

Ike points out that arguments in favor of military pay hikes two years ago were based on getting less but better manpower. If present strength of over 800,000 men isn't enough to fight a brush-fire war, then it won't be a brush-fire war, he adds.

To individual demands of military leaders, he says the joint chiefs collectively support his budget, but each separately wants extras.

Defense planning must be on a long-term basis in the age of crisis, and not subject to peaks and valleys, he says.



Bearings, Inc.

designs and supplies anti-friction bearing conversion units for many applications

This sliding, take-up unit is installed on textile mill equipment. It illustrates one of many clean, practical fixtures our bearing engineers have designed to hold the bearings best suited to carry shafts with a minimum of maintenance and with low power consumption. Our customer is pleased with the success of this installation in cutting operating costs, improving quality and increasing production.

Your request for a Bearings, Inc. engineer to survey your machinery and recommend anti-friction bearing conversions where practical, will be promptly answered. It's a service we're glad to perform at no cost to you.

Call the Bearings, Inc. branch nearest you NOW!

Providing bearing service in the North → **BEARINGS, INC.**

OHIO: Akron • Canton • Cincinnati • Cleveland • Columbus • Dayton • Elyria • Hamilton • Lima • Lockland • Mansfield • Toledo • Youngstown • Zanesville
INDIANA: Ft. Wayne • Indianapolis • Muncie • Terre Haute • **PENNSYLVANIA:** Erie • Johnstown • Philadelphia • Pittsburgh • York
WEST VIRGINIA: Charleston • Huntington • Parkersburg • Wheeling • **NEW JERSEY:** Camden
NEW YORK: Buffalo, Bolanrol Corp. • **MARYLAND:** Baltimore • **DELAWARE:** Wilmington

and

in the South → **DIXIE BEARINGS, INC.**

FLORIDA: Jacksonville • **GEORGIA:** Atlanta • **KENTUCKY:** Louisville • **LOUISIANA:** Baton Rouge • New Orleans
N. CAROLINA: Charlotte • Greensboro • **S. CAROLINA:** Greenville • **TENNESSEE:** Chattanooga • Kingsport • Knoxville • Nashville

Coming New Market: Outer Space

Get Ready for It Now, Says Top Missileman

Entire new industries will grow up in the Space Age, says Maj. Gen. B. A. Schriever.

Profits will go to managements who are prepared, he adds.—By R. R. Kay.

▪ Outer space is going to be a multi-billion dollar market.

How soon? Within the next ten years.

That's the word from Maj. Gen. B. A. Schriever. He's the commander of the Air Force's Ballistic Missile Division, headquartered in Los Angeles.

Product Potential—As the Air Force's top missileman, General Schriever says profits will go to those managements that prepare now to cope with the challenge.

"Already on the horizon are weather satellites, communications satellites, planetary rockets, and manned space ships. All of them will promote the rise of entire new industries," General Schriever says.

Sparked by Sputnik — Looking into the future, the General predicts that space vehicles, both military and civilian, will exert an ever-growing influence upon our lives.

Since Sputnik I our government has spent hundreds of millions of dollars on the conquest of space. This points up the revolutionary effect of an onrushing science and technology upon business enterprise, the General says.

What Exhibit Proved — Over 125,000 persons jammed into the second annual Western Space Age Conference and Exhibit in Los Angeles. And it's not surprising they did. Probably no business is more essential to the economy of the Farwest than the massive aircraft-missile-electronics industry.

What's behind the Space Age Conference? For one thing, the region wants to show the military and, in fact, the public, too, its leadership in the field. Also, industry realizes that defense business is a rapidly changing market.

More Pipe for Farwest

Pipe fabricators on the West Coast are sharpening their pencils. California, Oregon, and Washington will soon be in the market for 130,000 tons of steel plate.

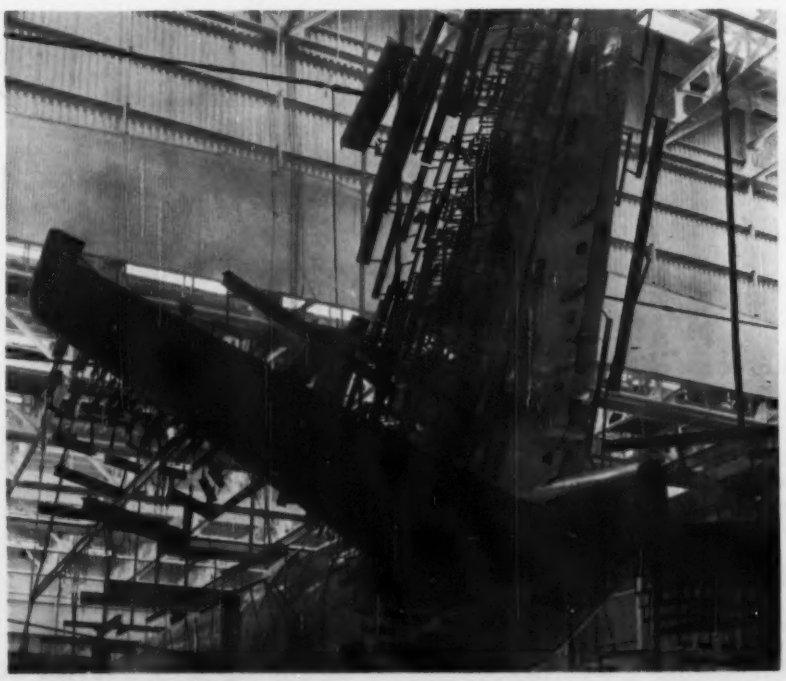
It's for large diameter pipe to bring water into those states.

Air Missile Carrier?

A nuclear-powered airplane carrying a missile for air-launching would have as much punch as a missile-carrying, nuclear-powered submarine.

Such a plane won't need new technological breakthroughs, according to F. A. Cleveland, chief advanced design engineer of a Lockheed Aircraft division.

Whiffletrees Used in Stress Test



SIXTEEN TON FORCE: Hydraulic rams attached to cables apply force of 16 tons against vertical tail surface of Convair 880 jetliner during test program. Force is distributed over aircraft by arrangement of whiffletrees.

Revere helps "fit the metal to the job"

AND A MAKER OF FINE CARS SAVES MONEY WHILE IMPROVING PRODUCT QUALITY

Recently, a manufacturer of top-flight motor cars was having trouble in producing the above escutcheon for the front bumper lamps used on his newest model.

First of all, the breakage of the part was excessively high. Second, the escutcheon which is drawn at an angle, and contains a concave surface on the inside presented a problem in that, after buffing, polishing, and flash plating, the finish produced did not exactly match the chrome-plated bumper.

Revere's Technical Advisory Service suggested these difficulties might be overcome by using Revere 70-30 Brass Strip.

Here, again, by "fitting the metal to the job" Revere's Technical Advisory Service was able to reduce manufacturing costs while improving the quality of the product. Finish of parts was improved while finishing costs were reduced. Finished parts proved an excellent match. Switching to the more ductile metal resulted in less tool wear, while breakage was reduced to less than 1%. All this with little adjustment of existing press equipment.

Why not consult with Revere's Technical Advisory Service and take advantage of its extensive knowledge in "fitting the metal to the job." This Service has saved others money, why not you?

REVERE COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801
230 Park Avenue, New York 17, N. Y.

Mills: Rome, N.Y.; Baltimore, Md.; Chicago, Clinton and Joliet, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Brooklyn, N.Y.; Newport, Ark.; Ft. Calhoun, Neb. Sales Offices in Principal Cities. Distributors Everywhere.

Titanium Carbides Wear Better

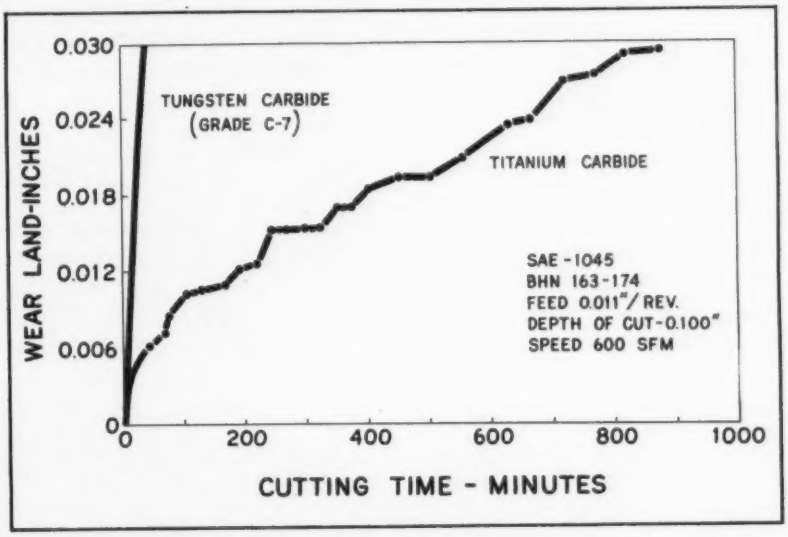
New Cutters Look Good in Lab and Shop Tests

In cutting contests titanium carbides have topped some ceramics and tungsten carbides.

But cost factors haven't been figured by discoverer, Ford Motor Co.—By E. J. Egan, Jr.

▪ Titanium carbide cutting tools will bear watching. Developed in Ford Motor Co.'s scientific laboratory, they're said to far outwear steel-cutting grades of tungsten carbide and ceramic tools in semi-finish and finish machining operations.

Lab director Dr. Michael Ference, Jr., classes the tools as "probably the most successful cermets (ceramic-metal combinations) to be produced since the development of tungsten carbides."



LAB EVIDENCE: On a 0.030-in. wear land basis, C-7 tool cut 85 lb of metal in 37 min. Titanium carbide cut 2000 lb in 890 min.

Tool Components — Nominal composition of the tool bits developed for steel cutting is 80 pct titanium carbide, with 10 pct each of nickel and molybdenum to bond the carbide powder particles. Hardness ranges from 90 to 93 on the Rockwell "A" scale. Other compositions are being studied for possible use in rough machining operations and on jobs with interrupted cuts.

Lab and shop testing the new tools is Dr. Michael Humenik, Jr., supervisor of the ceramics and powder metallurgy group which developed them. The lab routine involves standard machinability tests; shop tests include actual production operations using both brazed and mechanically clamped bits.

Seven Times Better—"On semi-finish and finish steel turning at normal cutting speeds," Dr. Humenik says, "titanium carbide tools are up to seven times better in tool life than the usual grades of tungsten carbide. On finish turning steel in the usual Brinell range at high speeds, titanium carbide is superior to all ceramics we have tested."

One test pitted Ford's new material against two commercial ceramic tools and a C-8 tungsten carbide bit. The job called for finish turning an 8620 steel forging gear blank (170-207 Bhn) at 1040 sfpm, using 0.013 ipr feed and 0.010 in. depth of cut.

Actual Performance — The C-8 material machined 1090 pieces per tool corner. One ceramic produced 1232 workpieces, and the other turned out 1666. The titanium carbide tool cut 6317 pieces per corner.

A second test matched a C-7 tungsten carbide tool against one of the new bits in semi-finish turning another forged steel (5140) gear blank in the 179-217 Bhn range. Turning speed was 400 sfpm, using 0.017-ipr feed and a depth of cut of 0.015 in. The C-7 cut 350 pieces per corner and the titanium carbide 1200, Dr. Humenik said.

How Much?—Metallurgical Dept. manager E. D. Marande says Ford has not explored all production cost factors of the new material. "But titanium carbide enjoys about a 3:1 advantage over tungsten carbide on the basis of specific gravity alone," he adds.

Dr. Ference is confident the new bits can compete costwise with tungsten carbide and ceramic tools. He also points out that widespread use of titanium carbide tools could do much to ease U. S. dependence on imported supplies of strategic tungsten.

Ford has no plans to produce the new tool bits for sale outside the company. However, it is exploring the idea of licensing other companies to make them.

INDUSTRIAL BRIEFS

Redesign Award — The John Woodman Higgins-Pressed Metal Institute Redesign Award was won by Malco Tool & Mfg. Co., Chicago. Messrs. Fred Faje, Matthew Sosnowski, and Louis Klynas conceived the idea of redesigning a pin terminal formerly made as a screw machine part from rod, to a metal stamping of .035 soft copper.

Refining Program—A joint development program of advanced petroleum refining instrumentation has been announced by Sun Oil Co. of Philadelphia and Genesys Corp. of Los Angeles. As the first step, Sun Oil starts construction this month of a $100,000 Product Control Center at its Marcus Hook (Pa.) Refinery.

Scrap Consultant — Robert H. Clymer, former vice president and director of Luria Brothers & Co., Inc., has established a ferrous scrap consulting firm, Clymer Associates, Inc., with headquarters in Reading, Pa.

GE In Phoenix—General Electric Co., has opened its new plant in Phoenix, Ariz., to serve as GE's Computer Department's new headquarters and laboratory building.

"Another fine feature of our desk trays, is the sealed corners . . . the coffee won't leak out."

Higher Standards—The American Standards Assn. has appointed C. L. Kent, asst. director, technical services division, Jones & Laughlin Steel Corp., and R. J. Stuart, Vascoloy-Ramet Corp., to its Standards Council. Mr. Kent represents the American Iron and Steel Institute, and Mr. Stuart the Cemented Carbide Producers Assn. on the council.

Container Expansion — Inland Steel Container Co., division of Inland Steel Co., is installing a new facility in its Jersey City, N. J., plant for the production of its full line of steel shipping containers.

Information, Please—The sixth edition of a Shot Peening textbook, has been published by Wheelabrator Corp., Mishawaka, Ind. The book includes information obtained in research, development and practical applications.

Sharpe Service Center—Another milling cutter grinding and modification service company has been opened by the Cutting Tool Div. of Brown & Sharpe Mfg. Co., Providence, R. I. The Brown & Sharpe Cutter Service is located in Bellwood, in metropolitan Chicago.

Minuteman Contract — A $77 million contract for a sub-system in the Air Force's Minuteman program has been awarded to Thiokol Chemical Corp., Bristol, Pa., for research and development of three stages of the Minuteman solid propellant rocket propulsion system.

New Can Plant—National Can Corp., Chicago, will erect a new plant at Hanover, Pa. Production capacity will be 10 million cans weekly. The Hanover plant will be located in National Can's Atlantic Division.

Tool Distributor—Mr. George Sharp, formerly general sales manager, Wadell Equipment Co., Inc., Clark, N. J., has organized a Machinery and Tool Distributorship under the name of George Sharp, Inc. Offices are located in Hasbrouck Heights, N. J.

More for Research — Metal & Thermit Corp. is planning to expand its electrochemical research and development activities. The company has purchased facilities in Detroit for its Electrochemical Research Lab and Pilot Plant. Future plans call for research programs in chromium, copper, nickel, and tin plating.

Room for Expansion—The Chicago branch of Vickers Inc., Div. of Sperry Rand Corp., has moved to a new building with increased facilities at 350 N. York Rd., Bensenville, Ill.

On the Level—Sperry Gyroscope Co., Great Neck, N. Y., will develop and manufacture a gyro platform that will furnish reference data to the Strategic Air Command's new B-70 intercontinental bomber. Nine other companies submitted bids for the contract, which is expected to reach several million dollars.

Name Change — Name of the American Metal Hose Div., The American Brass Co., has been changed to Anaconda Metal Hose Div. The change has been adopted to bring a closer tie-in with Anaconda trade-marked products made by Anaconda's wholly-owned subsidiary, The American Brass Co., and other Anaconda company subsidiaries.

The Big Lift — A contract to build six cranes for handling ship container cargo has been awarded Pacific Coast Engr. Co., Alameda, Calif., by Maryland Shipbuilding & Drydock Co. The cranes, costing over $1 million, are a part of the containerization program of Grace Line Inc.

Aluminum Cranes — Two all-aluminum welded overhead cranes will be installed by the Navy for heavy duty service. The overhead electric traveling cranes are being fabricated by Harnischfeger Corp., Milwaukee, for the Portsmouth, N. H., Naval Shipyard. Metal is being supplied by Kaiser Aluminum & Chemical Sales, Inc.

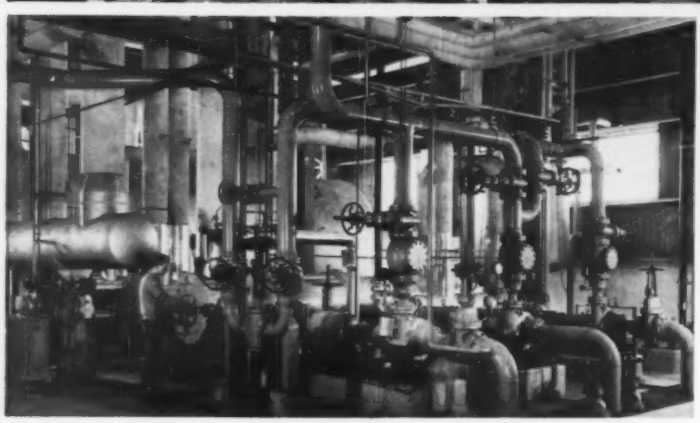
This man knows how to use the "Touch of Gold"

He is bringing a product closer to its finished state, adding the "Touch of Gold" by using exactly the correct Norton reinforced wheel to do the best job. To help you bring this value-adding benefit to your product there are many types of Norton reinforced wheels, using different types of reinforcement . . . glass cloth, nylon, cotton and combinations of them. There are resinoid and rubber bonds . . . straight and depressed-center shapes for every grinding, cutting off or slotting job where you need reinforced wheels. And every wheel is a product of Norton research.

Your Norton Man can bring these "Touch of Gold" benefits to your production. He is a qualified abrasive engineer with broad, practical experience that is backed by Norton's complete line of abrasive products and world-wide resources and services. He can save you production time and money. Call your Norton Man. NORTON COMPANY, General Offices, Worcester 6, Massachusetts.

NORTON
ABRASIVES

Making better products...to make your products better



The Sherritt nickel refinery at Fort Saskatchewan, Alberta, puts chemistry to work recovering nickel from a concentrate by an ammonia pressure leach process.

Sherritt's nickel refinery represents a most significant advance in the art of hydrometallurgy. Conventional smelter/electrolytic refinery techniques are replaced by a more efficient and more economical chemical process. The process, developed during four years of intensive pilot plant studies, is unique in its use of low pressure, low temperature ammonia leaching, followed by hydrogen reduction of metallic nickel from the aqueous solution. Three hundred and forty tons of nickel concentrate are processed each day with a yield of 35 tons of nickel, 10 tons of copper residue, and 1000 pounds of cobalt.

nickel refining

in a new era of hydrometallurgy

SHERRITT

FOOTE MINERAL COMPANY is the exclusive sales agent for Sherritt nickel and cobalt in the United States and Canada. For product literature, prices, and delivery information, contact the Foote Mineral Company, 438 Eighteen West Chelten Building, Philadelphia 44, Pa.

SHERRITT GORDON MINES LIMITED

W. R. Reid, Jr., vice president, elected a director, The Torrington Co., Torrington, Conn.

J. P. Somers, appointed a vice president, Wyckoff Steel Co., Pittsburgh.

I. G. Wentling, appointed executive vice president, Precision Tube Co., Inc., North Wales, Pa.; **M. F. Balch, Jr.,** vice president, sales; and **G. W. Swint,** vice president, plant operations.

D. L. Price, elected a vice president, The Norton Co., Worcester, Mass.

A. H. Van Wormer, appointed sales manager, Industrial Products Dept., Machinery Hydraulics Div., Vickers Inc.

M. L. Alter, appointed asst. director, sales, National Accounts, The Colorado Fuel & Iron Corp.

L. B. Polen, appointed manager, manufacturing, Forging and Castings Div., Allegheny Ludlum Steel Corp.

E. L. Simanek, appointed Pittsburgh district manager, United States Steel Supply Div.

L. F. Taylor, promoted to manager, sales development, Sales Dept., Superior Steel Div., Copperweld Steel Co., Carnegie, Pa.; **S. H. Cole,** appointed manager, stainless steel sales.

James Mitchell, appointed district sales manager, Colorado area, Harbison-Walker Refractories Co., Canon City, Colorado headquarters.

B. F. Rivers, appointed district sales manager, Spokane, Washington, The Colorado Fuel & Iron Corp.

H. W. Nelson, promoted to technical director, Carbon Div., Great Lakes Carbon Corp.

R. B. Beam, named industrial district manager with headquarters in Chicago, Joseph Dixon Crucible Co., Jersey City, N. J.

D. F. Hastings, named district manager, Moline, Ill., The Lincoln Electric Co., Cleveland.

C. S. Gischel, appointed director, marketing and sales, The Stanley Works, New Britain, Conn.

D. F. Cayce, appointed sales manager, data processing equipment and **Dr. D. R. Helman,** consulting computer engineer, operations analysis, General Electric Co.'s Computer Dept., Phoenix, Ariz.

The following promotions have been made in Goodyear Tire & Rubber Co.'s Metal Products Div. **C. D. Thompson,** appointed regional sales manager, Chicago; **R. O. Bowersox,** named manager,

(Continued on P. 106)

P. J. Reeves, appointed vice president, sales, The Timken Roller Bearing Co., Canton, O.

S. T. Salvage, became general manager, Automotive Div., The Timken Roller Bearing Co.

R. G. Wingerter, named director, sales, The Timken Roller Bearing Co., Canton, O.

Plastic Steel® saved over $1000... plus days of downtime for MARRINER

A broken centrifuge at Marriner Combing Company stopped production on an important order. PLASTIC STEEL was used for on-the-spot repairs and the machine was back in operation within an hour at a cost of less than $5.00. Using conventional repair methods would involve several days and cost over $1000.

Hundreds of companies have saved time and money by repairing worn machine parts, cracked castings, leaking hydraulic systems and tanks, rebuilding worn pumps or valves, etc., with PLASTIC STEEL®.

PLASTIC STEEL® and other Devcon products are used for making jigs, fixtures, metal-forming dies, plastic and rubber molds, foundry patterns and core boxes, and other industrial tools.

PLASTIC STEEL® — as easy to use as modeling clay — hardens to steel-like strength in 2 hours . . . can be machined with regular tools. Bonds all metals, wood, glass, concrete, etc. to itself or each other. Extremely high tensile, compression, impact strength — excellent chemical resistance.

Find out how PLASTIC STEEL® and other Devcon products can save time, cut maintenance costs and speed production in your plant — write for FREE bulletin today.

Distributed nationally by leading industrial suppliers

DEVCON CORPORATION

50 ENDICOTT STREET, DANVERS, MASS.

(Continued from P. 105)

wheel sales; **D. E. TeLinde,** promoted to senior sales correspondent; **A. R. Wilson,** named to a sales staff position with the Wheel & Service Sales Dept.; and **J. L. Harsha,** appointed to the staff, original equipment sales.

E. S. Murrah, named director, engineering, Rolling Mill Div., Morgan Construction Co., Worcester, Mass.

W. G. Gudlip, appointed manager, quantity sales, Cutler-Hammer Inc., Milwaukee.

W. K. Smith, named asst. manager, systems and procedures, National Steel Corp.

J. W. Ferguson, promoted to manager, field sales, Durez Plastics Div., Hooker Chemical Corp.

B. L. Burns, appointed manager, new Design and Development Dept., Rolling Mill Div., Morgan Construction Co., Worcester, Mass.

S. A. Ott, elected vice president, operation, Eastern Div., The Colorado Fuel & Iron Corp.

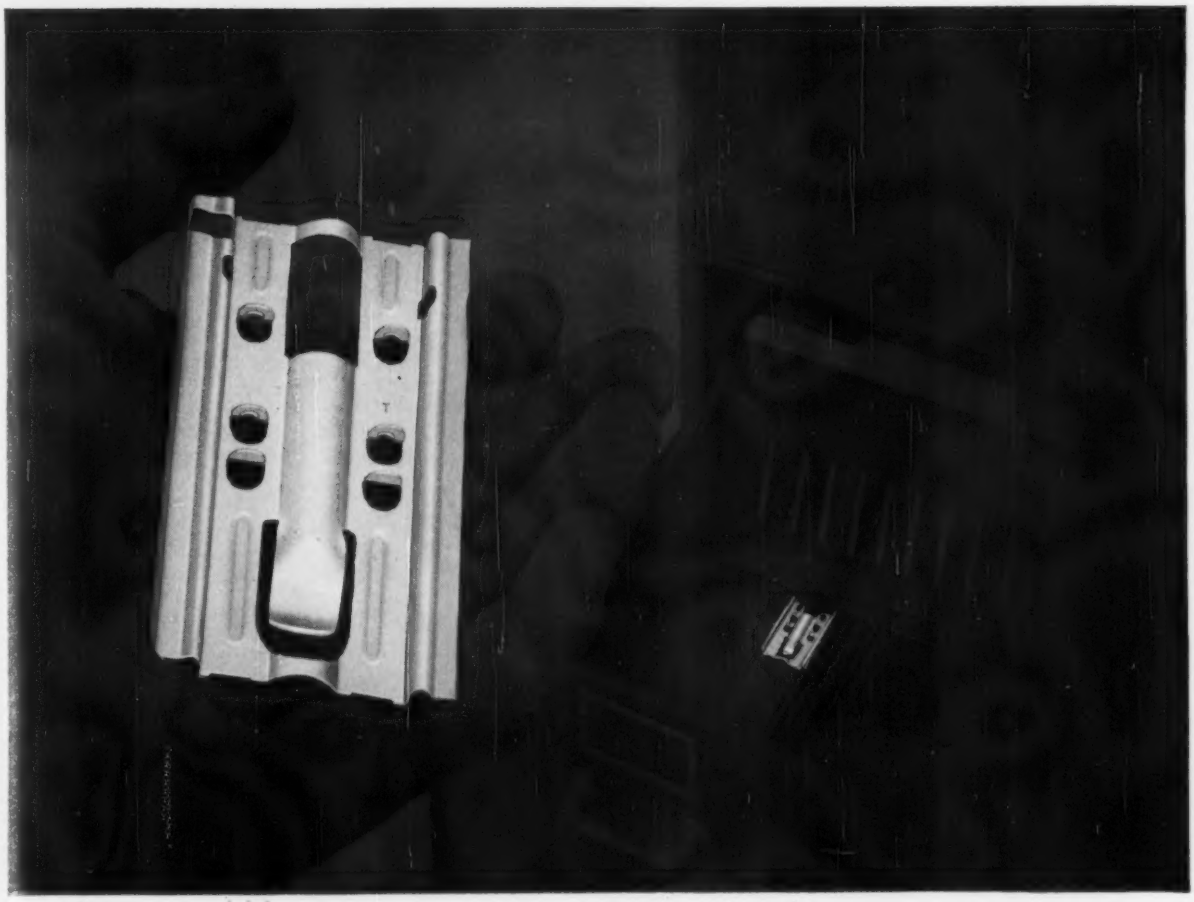
The following appointments are within the Eastern Chemical Div. of Hooker Chemical Corp. **J. S. Coey,** named sales manager; **R. F. Schultz,** named production manager; **A. R. Perry,** appointed comptroller; **P. D. Bosso,** industrial relations manager.

J. T. Schaner, appointed purchasing agent and **F. J. Weber** as asst. purchasing agent, J. H. Williams & Co., Buffalo.

Thomas Trowbridge, named general sales manager, Coated Abrasive Div., Behr-Manning Co., Troy, N. Y.

The following promotions are within the General Traffic Dept. of The Youngstown Sheet & Tube Co., Youngstown, O. **J. J. McDermott,** promoted to assistant gen-

(Continued on P. 111)



Engineered by Tinnerman...

Easier to assemble...easier to operate... **SPEED CLIP**® costs 50% less, too!

Assembly of the SUPER-FILER® *Divide-a-File* mechanism was considerably simplified when the General Fireproofing Company switched to a special SPEED CLIP design. Sightless people do the assembling without former difficulties of fitting spring wires into non-uniform stampings.

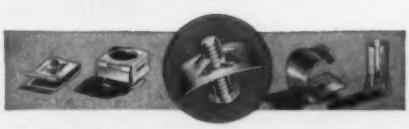
With this SPEED CLIP, the "self-adjusting" *Divide-a-File* slides more smoothly back and forth in the channel. Locking in the desired position is more positive, too.

This is another example of how Tinnerman Engineering goes far beyond the original fastening idea—how we work with customer engineering departments to produce better working units. And in the above case, a per-part cost reduction of 50% was achieved. In only 4 months, General Fireproofing had saved enough through lower assembly and parts costs to write-off new tooling needed to produce the SPEED CLIP.

You, too, can achieve savings and improvements like these on your assemblies. Invite your local Tinnerman sales representative in for a discussion of the SPEED NUT methods of better fastening at lower cost. He's listed in most Yellow Pages, under "Fasteners". Or write to:

TINNERMAN PRODUCTS, INC.
Dept. 12 • P. O. Box 6688 • Cleveland 1, Ohio

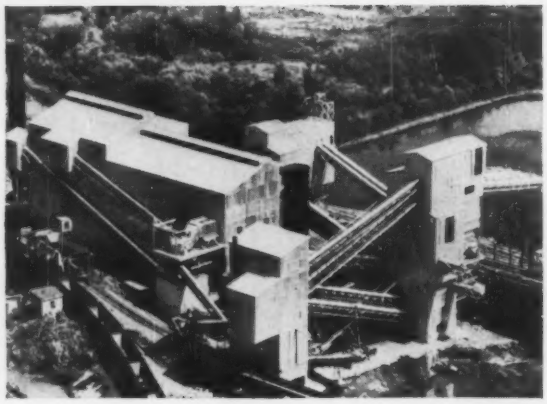
TINNERMAN
Speed Nuts®



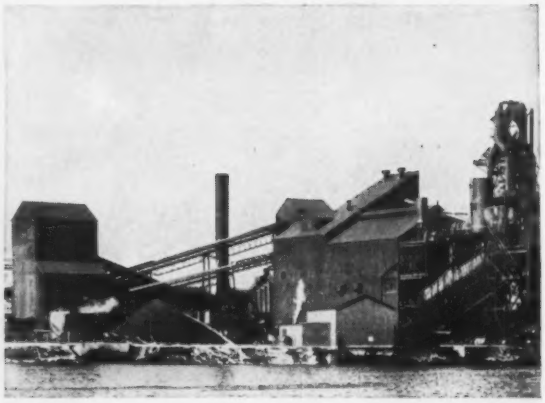
FASTEST THING IN FASTENINGS®

CANADA: Dominion Fasteners Ltd., Hamilton, Ontario. GREAT BRITAIN: Simmonds Aerocessories Ltd., Treforest, Wales. FRANCE: Simmonds S.A., 3 rue Salomon de Rothschild, Suresnes (Seine). GERMANY: Mecano-Bundy GmbH, Heidelberg.

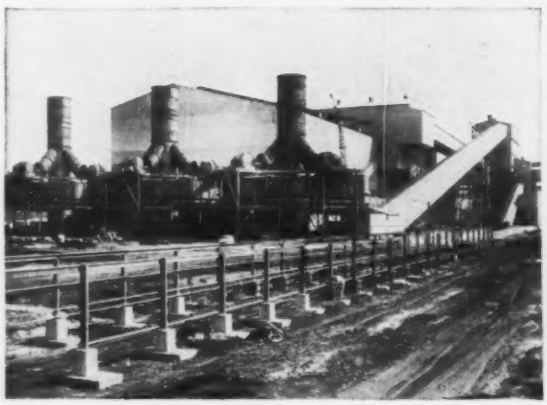
First these:



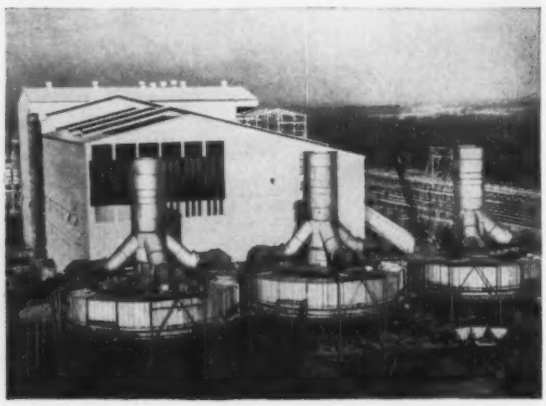
ARMCO



McLOUTH



GARY



SAXONBURG

and now:

THE WORLD'S LARGEST SINTER MACHINE

Sinter machine width: 13′ 2″

Sinter machine length: 184′

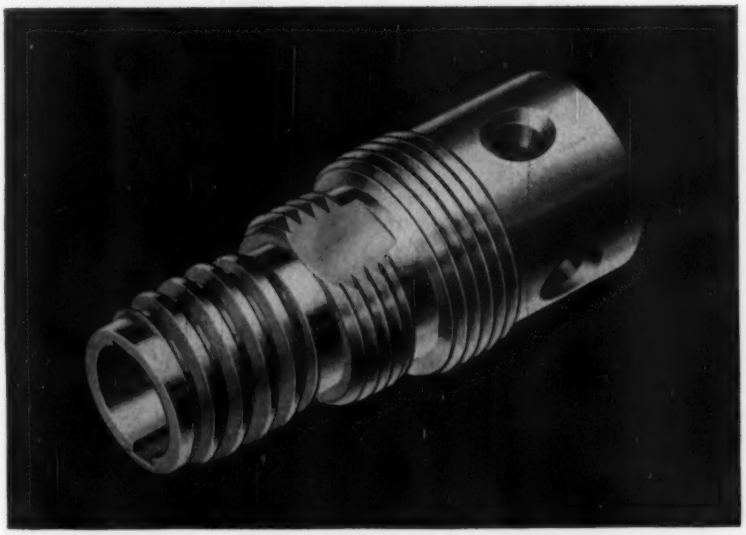
Sinter machine area: 2419 sq. ft.

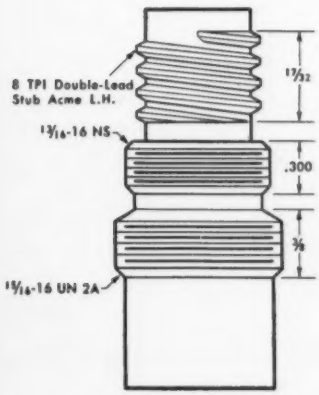
Engineering constructor—Dravo Corporation

For: Jones & Laughlin Steel Corporation, at Aliquippa, Pennsylvania

DRAVO
CORPORATION
PITTSBURGH 22, PA.

COST CUTTING on tough jobs—like rolling a double-lead Stub Acme thread—may be easier than you think. Olson Mfg. Co. needed only a minor adjustment in a standard Anaconda rod

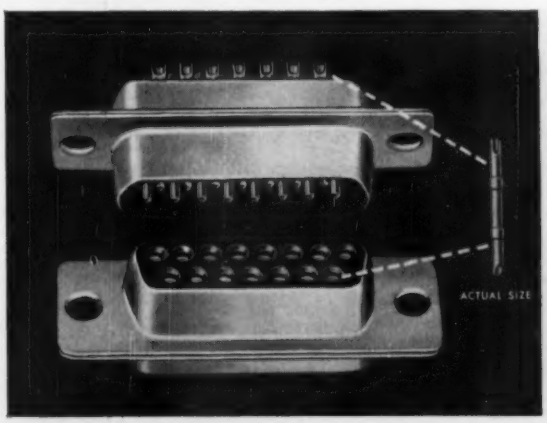


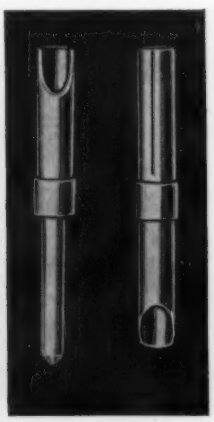


Rolling three threads *(drawing, right)* in two positions on a 6-spindle automatic meant cost savings for Olson Mfg. Co., Worcester, Mass. The Acme thread, however, posed problems. American Brass specialists suggested minor modification of standard Anaconda Free-Cutting Brass Rod to provide the extra ductility needed. The idea worked and the resulting valve spindle is shown above, about 1½ times actual size.

—or maybe you need a different alloy rod. The tiny connectors, right, have to be machined from .078" rod, requiring many precision form-cutting, drilling, slotting operations. So machinability is a vital property of the rod used—but so are adequate electrical conductivity, high strength, and fatigue resistance.

Cannon Electric, Los Angeles, makers of these electrical plug assemblies, had to find a rod with a delicately balanced combination of mechanical properties to provide the unfailing and continuous performance required. They found it in Anaconda Free-Cutting Phosphor Bronze-610 Rod, developed by American Brass metallurgists to combine the strength, resilience, fatigue resistance of phosphor bronze, and machinability approaching that of free-cutting brass.





MEETING the joint requirements of designers, manufacturing men, and buyers—to achieve high quality and performance while simplifying fabrication and cutting over-all costs—is an important function of American Brass technical specialists. For imaginative and practical help of this kind, see your American Brass Company representative or write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. 5009

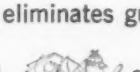
ANACONDA®

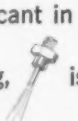
COPPER · BRASS · BRONZE
NICKEL SILVER · MILL PRODUCTS
Made by The American Brass Company

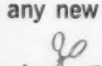
BETTER LUBRICATION BEGINS WITH ALEMITE **OIL-MIST**

How to cut lubricant costs up to 90% — and increase production!

Large and small plants in many industries are making important maintenance savings while actually boosting machine output—with Alemite Oil-Mist Automatic Lubrication.

The Oil-Mist system atomizes oil into air-borne particles, carries them through tubing to all lubrication points and bathes every moving surface with a cool film of clean lubricant while machines operate. It provides constant, uniform, completely automatic lubrication to a few or to hundreds of bearings. Accurate and foolproof, Oil-Mist eliminates guesswork. No bearing can be overlooked  or over-lubricated.

Three types of Oil-Mist fittings apply lubricant in the form required. Either a mist fitting or a condensing fitting or a spray fitting,  is used to lubricate any lubrication point.

An Oil-Mist system can be applied to any new or installed machine. Find out in detail how it cuts costs,  reduces man-hours and machine downtime, extends bearing life, and increases production.

Write Alemite, Dept. **G-39,** 1850 Diversey Parkway, Chicago 14, Illinois.

Makers of these automatic centralized lubrication systems: Oil Mist · Accumatic · Accumite

1850 Diversey Parkway, Chicago 14, Illinois

ALEMITE
DIVISION
STEWART-WARNER
CORPORATION

Symbol of **SW** Excellence

(Continued from P. 106)

eral traffic manager; **W. C. Brick,** assistant to the general traffic manager; **G. J. Phelan, Jr.,** staff assistant.

J. W. Collins, Jr., appointed Detroit district sales manager, Aluminum Co. of America.

J. D. Saussaman, appointed asst. general superintendent, Iron & Steel Div., Kaiser Steel Corp.'s Fontana plant; **R. W. Likins,** appointed division superintendent, industrial relations, Fontana plant.

W. D. Pollard, appointed abrasive engineer, Norton Co., Worcester, Mass.; **R. D. Neighbors,** appointed a field engineer, St. Louis district office.

OBITUARIES

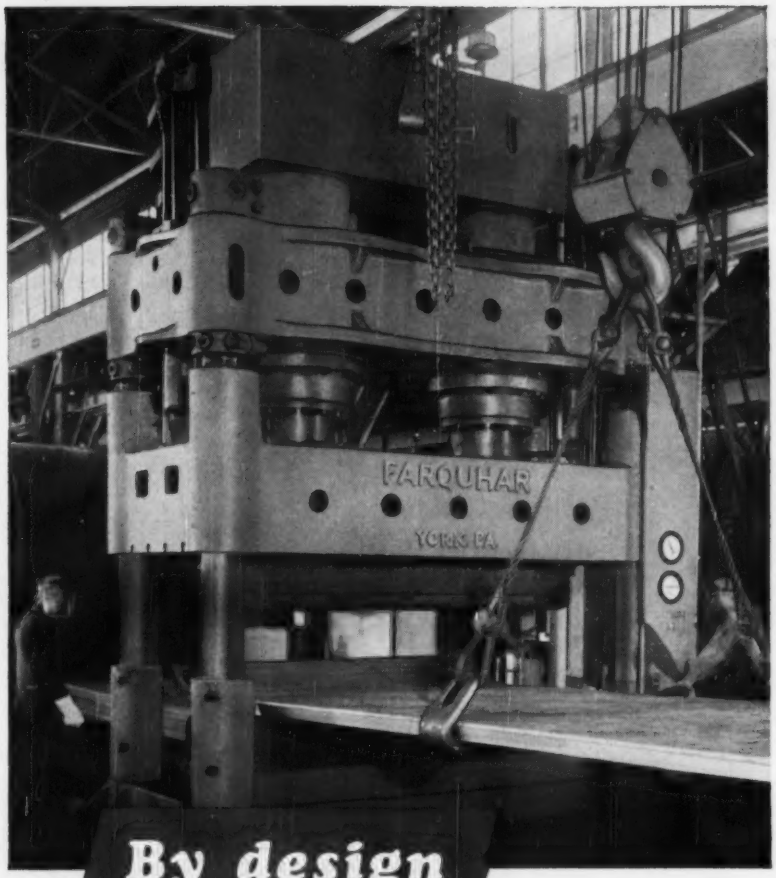
W. C. Stumpf, Jr., 50, vice president and treasurer, Jessop Steel Co., Washington, Pa., and the Green River Steel Corp., Owensboro, Ky.

R. G. Patterson, 67, assistant to the president, Lamson & Sessions Co., Cleveland.

R. E. Hayden, 51, sales manager, Fuel Fired Furnace Div., Hevi-Duty Electric Co., Milwaukee.

Paul Klain, 49, a group leader, Metallurgical Laboratory, The Dow Chemical Co., Midland, Mich.

H. A. Bedworth, 66, retired sales engineer, The Bristol Brass Corp., Bristol Conn.



By design

this OLIVER-FARQUHAR Forming Press will cut your production rejects

By design this 1000-Ton Oliver-Farquhar Four-Column Hydraulic Forming Press has unusually rigid construction. This guarantees minimum deflection under full tonnage loads and close tolerance operation for accurate, high-output production. **By design** it can be equipped with either manual or electric pushbutton controls. You can select the controls to match your production requirements. **By design** special high and low pressure fluid circuits are incorporated in this press. Fast advance, controlled pressing and fast return of the rams assure maximum production.

Oliver-Farquhar Hydraulic Presses are available in popular standard sizes from 50 to 5000-ton capacities. O-F Mechanical Gap Presses are available in 75 to 200-ton capacities. You are invited to write, wire or phone for details on these presses or, better still, ask for our proposals or recommendations. And remember, Oliver-Farquhar Conveyors can be designed and built to give you the ultimate in automated loading and unloading for maximum press production.

The Oliver Corporation
A. B. FARQUHAR DIVISION
Press and Special Machinery Departments
York 22, Pennsylvania

OLIVER

Farquhar PRESSES

Also Manufacturers of Farquhar Conveyors

PRODUCTION AUTOMATED RIVETING *a major break-through in the Automation of Assembly*

PAR ... **Originated by TRS** with the invaluable collaboration of some of industry's top production engineers who sought a major break-through in the automation of assembly operations to reduce costs.

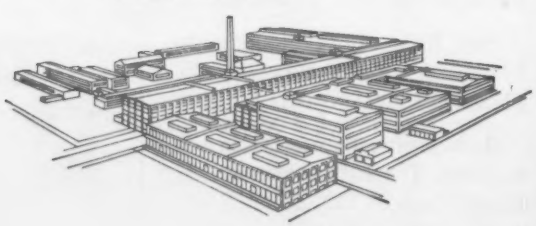
PAR ... **A name given by TRS to its Production Automated Riveting process** . . . continuously developed and perfected for 3 years. Proved successful in some of industry's most efficient plants. Now, TRS has sufficient engineers especially trained in the PAR process to serve all manufacturers.

PAR ... **It makes riveting practically a new fastening method through efficiently integrated and automatic . . .**

1. FEEDING of tubular rivets or related products.
2. TRANSFER of parts between riveter stations by means of sliding or rotating fixtures or dial tables. Or through synchronization with conveyors.
3. SEQUENCING the operation of from 3 to 15 rivet setters which make all fastenings simultaneously or in any desired sequence.
4. CONTROL of setting force as required by parts thickness or material characteristics.
5. SENSING of improper conditions and stopping equipment to avoid injury to parts, equipment or operator.
6. EJECTION of parts as required.

TRS

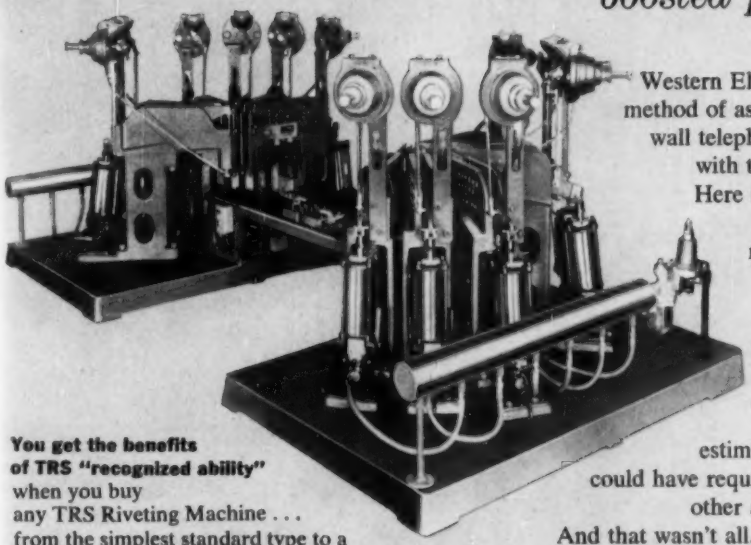
TUBULAR RIVET & STUD COMPANY
QUINCY 70, MASS.



Midwest Office & Warehouse in Chicago • SALES OFFICES: Atlanta • Buffalo • Charlotte • Chicago • Cleveland Dallas • Detroit • Hartford • Indianapolis • Los Angeles New York • Philadelphia • Pittsfield • Quincy • St. Louis Seattle. *See "Yellow Pages" for phone numbers.*

WESTERN ELECTRIC

boosted production rate 80%



Western Electric engineers sought the lowest cost method of assembling the many components of the wall telephone baseplate. TRS engineers worked with them in solving this fastening problem. Here is the specially engineered Multi-Head Riveter that resulted. Ten automatic riveting machines are combined with a specially designed rolling assembly fixture to minimize handling of the five parts of the assembly and, in two fast operations, automatically attach parts to baseplate with ten rivets in a complex pattern. It was estimated that the same assembly operation could have required approximately 35% more labor if other applicable facilities had been installed. And that wasn't all. Later, when production requirements increased, the addition of a second transfer fixture and a second operator boosted the production rate 80%. Western Electric know-how shows in the profitable solution . . . so does TRS ingenuity and experience.

You get the benefits of TRS "recognized ability" when you buy any TRS Riveting Machine . . . from the simplest standard type to a complicated special design.

TRS offers more machines, to more exactly meet your need . . . will lease but likes to sell . . . guarantees performance and sticks by you with all-out service.

PAR . . . It's a TRS Process for very good reasons!

Obviously, there are two critical elements in the PAR Process. Essential is the special and extensive knowledge and experience needed to design an integrated system of standard or multi-head riveters, feeders, transfers and controls for the particular assembly involved. Equally important are superior knowledge and experience in the design, tooling and application of Multi-Head Riveters because these are usually employed.

TRS originated Multi-Head Riveters over three years ago and is the only experienced source of these machines. Further, because this TRS development opened up new possibilities for automating the riveting process, TRS was able to begin three years ago to develop the special experience and application engineers required to fully meet the requirements of the PAR Process.

PAR . . . A New Opportunity to Reduce Direct Labor Charges

With this new help, hundreds of manufacturers . . . large and small . . . can effect substantial savings in direct labor charges, increase production rates, decrease parts spoilage and machine down-time. Look into it now if your product can be riveted, and especially if several rivets are involved.

The yearly amortized cost of the TRS Multi-Head Riveter equipment is low because it will not be obsoleted by changes in product design or production line.

To save more . . . To protect against equipment obsolesence . . . don't buy any Riveting Machines until you investigate the PAR Process

You're not required to use TRS Rivets but you'll be better off if you do

There are no contracts or obligations involved in the PAR Process. However, it is true that the more automatic you make your riveting, the more important it is to use rivets that reduce operating troubles and machine down-time. And, we can give you good, factual reasons why TRS Tubular Rivets are more reliable in essential qualities and uniformity. Ask for the facts . . . judge for yourself.

Advt. Copyright by Tubular Rivet & Stud Company, 1958

IN PRODUCT AFTER PRODUCT AFTER PRODUCT . . . WEIRTON HOT- AND COLD-ROLLED SHEET

In automobiles and portable TV cabinets, in air conditioners, stoves and laundry equipment—in almost any application you can name you'll find Weirton hot- and cold-rolled sheets at work.

Their roles: helping one manufacturer after another to produce standout products at low cost with no hitches in fabrication.

You can put to good use the uniform gauge, strength and ductility of Weirton hot- or cold-rolled sheet.

Weirton is always ready to serve your needs for quality sheets. For prompt and complete service just phone or write Weirton Steel Company, Dept. A-3, Weirton, West Virginia.

WEIRTON STEEL COMPANY

WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

a division of

NATIONAL STEEL CORPORATION

Steels' Fatigue Strength Loss Linked to Retained Austenite

When a steel fails in fatigue at high stress levels, is retained austenite sometimes responsible?

Before you specify a high-strength steel for any "critical" application, make sure you know the facts about retained austenite.

By P. M. Unterweiser—
Metallurgical Editor

▪ Some of our strongest steels can (and do) fail in fatigue because of retained austenite. Their "trouble" is that they tend to retain some critical amount of austenite after heat treatment.

Under severe stress in service, the austenite transforms to martensite —untempered martensite. Change in volume and other factors contribute to the formation of microcracks. In time, these cracks enlarge and result in premature failure.

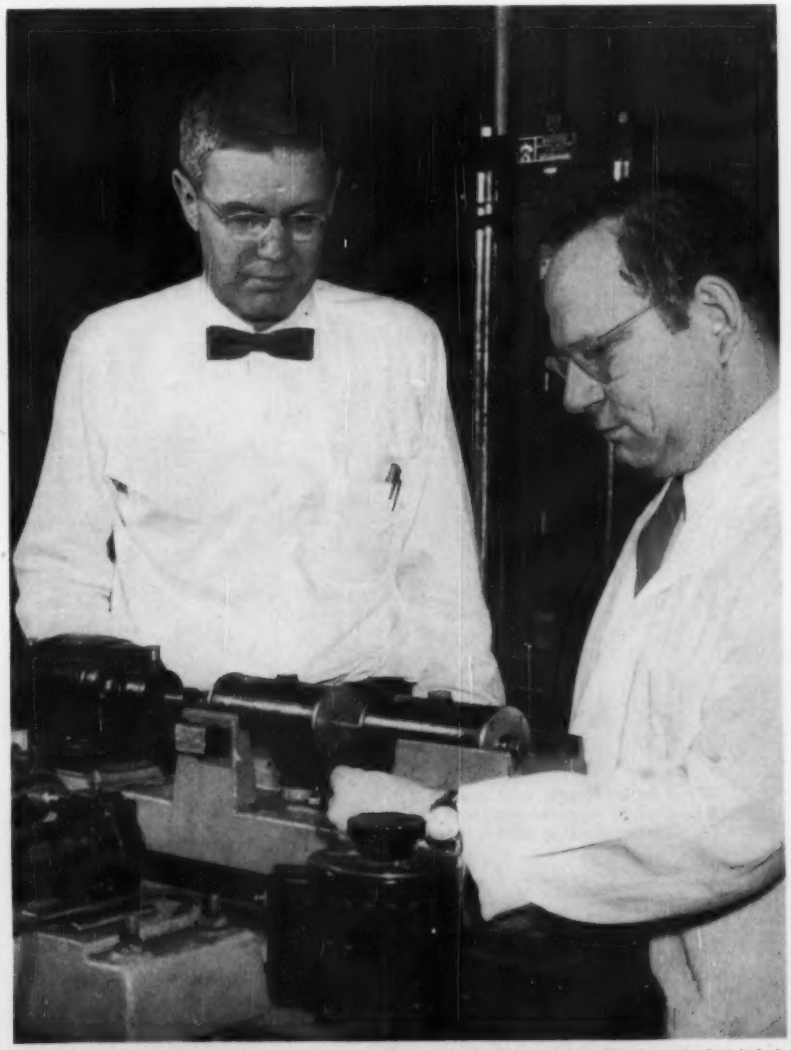
It's a fundamental metallurgical chain-reaction—one that metallurgists have known about for a long time. But with few exceptions, even this awareness has not appreciably modified their tastes in steels for "critical" applications. Still leading the lists of steels for ultra-high-stress service are many whose proclivity toward retained austenite is well known.

Conflict in Properties—On the surface, at least, the picture appears to be one of serious confusion. Probing deeper, the confusion seems to stem from a conflict in properties inherent in some of our most widely used high-strength steels. It boils down to the old proverb: you can't eat your pie and still have it.

A number of austenite-prone steels have superior mechanical properties—4340, for example. Wherever possible, these properties have been further enhanced by vacuum melting, vacuum pouring, and analogous melting improvements.

But vacuum techniques are not the panacea for every metallurgical problem. Retained austenite is typical of the kind of problem over which they have no control whatsoever.

An Eye-Opener — Highlighting the role of retained austenite in the fatigue failure of high-strength



TESTING: NBS metallurgists J. A. Bennett (left) and H. E. Frankel (right) link retained austenite to steel's lowered fatigue strength.

TABLE 1: Compositions of Steels Tested

Steel	C	Mn	Si	Cr	Ni	Mo
SAE 4340	.44	.67	.27	.77	1.74	.20
Tool Steel "A"	.63	.60	.21	.70	1.20	.16
Tool Steel "B"	.88	1.51	.28	....	....	.25
SAE 52100	1.06	.34	.19	1.38	....	....

TABLE 2: Steel Hardness vs Fatigue Strength

Tempering Temperature °F	Tempering Procedure	Quench	4340		Tool Steel "A"		Tool Steel "B"		52100	
			Dir.	Mar.	Dir.	Mar.	Dir.	Mar.	Dir.	Mar.
350	M_1	Rc	53.5							
		ksi	157							
	M_2	Rc	53					62.5*		
		ksi	172					120		
	M_3	Rc			62*					63.5*
		ksi			110					130
400	M_1	Rc			58		62.5		60	61
		ksi			150		170		145	158
	M_2	Rc				56			60	
		ksi				155			155	
	M_3	Rc		49.5			60.5			
		ksi		155			165			
450	M_1	Rc		50						
		ksi		142						
	M_2	Rc								
		ksi								
	M_3	Rc	49							
		ksi	160							
500	M_1	Rc	49		53.5	53.5	59	58.5	58.5	
		ksi	140		134	135	150	146	142	
	M_2	Rc		49	53					
		ksi		150	144					
	M_3	Rc						56	57.5	
		ksi						146	155	
550	M_1	Rc								
		ksi								
	M_2	Rc		48		52	56	57		57.5
		ksi		148		130	152	158		155
	M_3	Rc	46			51				
		ksi	140			138				
600	M_1	Rc								
		ksi								
	M_2	Rc	47		51		54.5		57	
		ksi	145		135		150		151	
	M_3	Rc								
		ksi								
700	M_1	Rc								
		ksi								
	M_2	Rc								55
		ksi								143
	M_3	Rc								
		ksi								

M_1—Temper directly after quench. *—Not used in any further analysis.
M_2—Refrigerate between quench and temper.
M_3—Refrigerate then double temper.

steels is a recent report from the National Bureau of Standards, Washington. Titled "Fatigue Properties of High-Strength Steels," it was prepared by H. E. Frankel, J. A. Bennett, and W. A. Pennington. (This work also forms the basis of the Ph. D. thesis submitted by Dr. Frankel at the University of Maryland.)

The report is an eye-opener. Its impact is bound to be profound, even though what it says isn't altogether new. Some metallurgists might take heated exception to its broader implications. Most will admit (perhaps reluctantly) that it simply confirms what has been suspected right along—i. e., retained austenite can actually promote fatigue failure at high stress levels.

Why Worry?—At "high stress levels" must be emphasized. Retained austenite is far less likely to be a problem in non-critical applications. Further, the loss of strength due to austenite is not too great (see Table 3). It becomes a significant loss only when optimum strength is absolutely essential.

Why worry about retained austenite in such cases? Because it can contribute to a steel's failure even though heat treatment is entirely proper—when neither inclusion count nor type of inclusion is detrimental—whether carbon content is high (about 1 pct) or in mid-range (0.44 pct)—even though surface finish is optimum from a fatigue standpoint.

In other words, it can promote a type of failure that isn't anticipated by normal quality considerations. As failures go, it's a kind of booby-trap that goes undetected to the often bitter end.

Air-Melted — The report deals with four high-strength steels: SAE 4340, two low-alloy tool steels, and SAE 52100. All four were air-melted. In addition to being relatively low in alloy content, they represent four levels of carbon content progressing in roughly 20-point steps from 0.44 to 1.06 pct. Chemical analyses are listed in Table 1.

(According to the authors: "The basic assumption used in the design of the experimental program was that alloy content, other than carbon, was not as important as microstructure in the determination of fatigue strengths.")

To detect snags that often plague the validity of fatigue test results, test specimens were prepared in line with both conventional and

special practice. Conventionally prepared, the specimens were rough machined, heat treated, and then finished and polished. Specially-treated specimens were first completely machined and polished, then copper plated, heat treated, and stripped of copper in a boiling solution of cyanides.

New Approach—The object of the "special" treatment was to eliminate the unpredictable factors that are incurred when specimens are finish ground as a final step before actual testing. Grinding (or polishing) may induce either beneficial or harmful residual stresses which can influence test results. To this extent, the special treatment avoided "residual stress conditions on the surface which would mask the metallurgical effects."

As for heat treatment, all specimens were held for one hour at 1550°F in a chloride salt bath. Although this austenitizing temperature is slightly high for some of the steels, it provided a constant ASTM grain size of 7-9.

Next, according to the report, "specimens of each steel were subjected to one of six treatments: 1) direct quench and temper, 2) marquench and temper, 3) direct quench, refrigerate, and temper, 4) marquench, refrigerate, and temper, 5) direct quench, refrigerate, and double temper, 6) marquench, refrigerate, and double temper."

Measuring Fatigue—The fatigue tests were run on R. R. Moore, rotating beam machines at a speed of about 8000 rpm. Loads were applied only after specimens reached maximum speed. Each specimen was run until it fractured completely.

The report makes this comment on the evaluation of fatigue results: "The usual practice in the evaluation of the fatigue properties of steels is to compare the fatigue limits. However, it is not an uncommon occurrence for high-strength steels to fracture after more than 20×10^6 cycles, which value is frequently chosen as the cut-off point in the determination of endurance limits.

"Consequently the position of the knee of the S-N curve (stress amplitude vs log number of cycles to failure) is poorly defined for the high-strength steels and precise determination of a fatigue limit is difficult. In the interest of time and economy, the finite portion of the S-N curve was investigated and the fatigue strength at 10^5 cycles was selected as the basis for analysis."

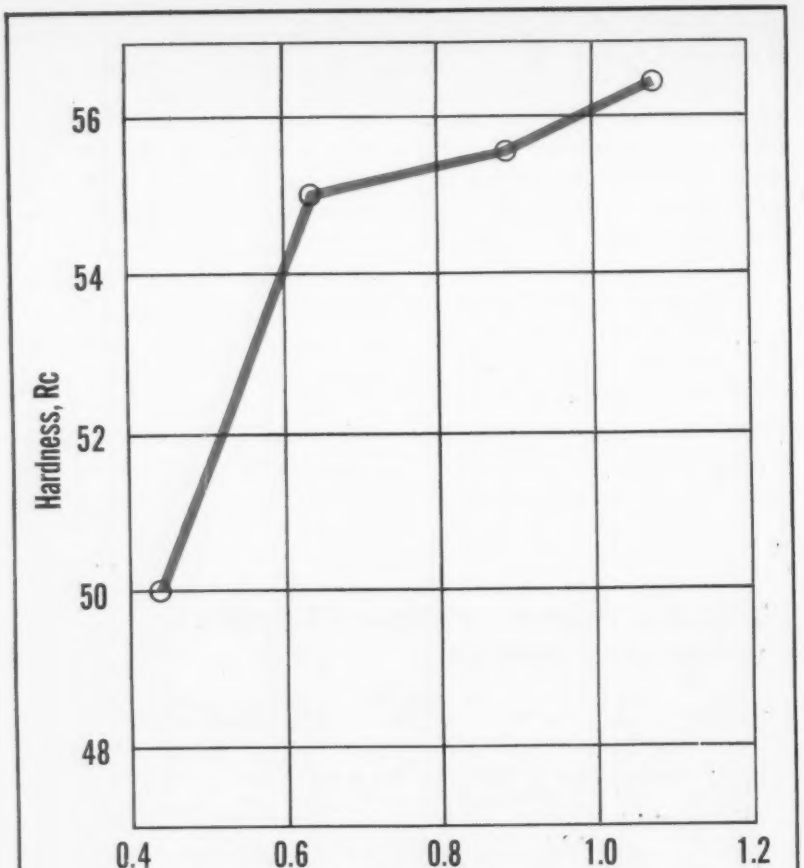
Austenite's Role—Hardness vs fatigue results are summarized in Table 2. As might be expected, there is a "strong correlation between fatigue strength and hardness." For this reason, "it was desirable to adjust the data for each steel to an average hardness before attempting to determine the effects of other variables."

In all cases, amounts of retained austenite recorded were measured by X-ray diffraction. Although the fatigue values for all four steels are generally good, the deleterious effect of retained austenite is quite evident (Table 3). Refrigeration improved fatigue strength by elimi-

TABLE 3: Adjusted Fatigue Strengths vs Retained Austenite

Heat Treatment	Hardness	Sn (10^5~)	Adjusted Sn (10^5~)	Retained Austenite, pct* Film	Norelco	GE	Av.
	Rc	psi	psi				
4340—Refrigerated, Slope = 4.76; Av. Rc Used = 49.4							
DM_2 600	47	145×10^3	156.4×10^3	0	—	0	0
MM_2 550	48	148	154.7	2.5	4.5	3.0	3
MM_2 500	49	150	151.9	4	4	3.6	4
DM_2 350	53	172	157	0	—	0	0
MM_2 400	49.5	155	155	0	—	0	0
DM_2 550	46	140	158.2	0	—	0.9	0
DM_2 450	49	160	161.9	0	—	0	0
Nonrefrigerated, Slope = 4.29							
DM_1 350	53.5	157	139.4	11	11.3	11.3	11
MM_1 450	50	142	139.4	9.4	8.2	8.9	9
DM_1 500	49	140	141.7	6	6	6	6
Tool Steel "A"—Refrigerated, Slope = 4.12; Av. Rc Used = 53.4							
DM_2 600	51	135×10^3	144.9×10^3	0	—	0.86	0
MM_2 550	52	130	135.8	3.5	4	4.4	4
DM_2 500	53	144	145.6	0	—	0	0
MM_2 400	56	155	144.3	2	—	2	2
MM_2 550	51	138	147.9	0	—	1.1	0
Nonrefrigerated, Slope = 3.3							
DM_1 400	58	150	134.6	18	17.1	18	18
MM_1 500	53.5	135	134.7	3.5	—	2.7	3
DM_1 500	53.5	134	133.7	2.5	—	3	3
Tool Steel "B" Refrigerated, Slope = 2.9; Av. Rc Used = 57.8							
MM_2 550	57	156×10^3	160.3×10^3	0	—	1.2	0
DM_2 600	54.5	150	159.6	0	—	1.1	0
DM_2 550	56	152	157.2	2	2.4	3.4	3
DM_2 400	60.5	165	157.2	2	—	2	2
MM_2 500	58	146	151.2	5	5	4.6	5
Nonrefrigerated, Slope = 6							
MM_1 500	58.5	146	142.2	16	16.3	16.2	16
DM_1 400	62.5	170	141.8	12	9	11	11
DM_1 500	59	150	144.5	11	10.5	11	11
52100—Refrigerated, Slope = 2.50; Av. Rc Used = 58.1							
DM_2 600	57	151×10^3	153.8×10^3	0	—	0	0
MM_2 700	55	143	150.8	0	—	1	0
DM_2 400	60	155	150.2	2	—	2	2
MM_2 550	57.5	155	156.5	0	—	0	0
DM_2 500	57.5	155	156.5	0	—	0	0
Nonrefrigerated, Slope = 6.4							
MM_1 400	61	158	134.1	19	20	21	20
DM_1 500	58.5	142	142.1	4	4	4.3	4
DM_1 400	60	145	133	10	11	10	10

D —Direct quench.
M —Marquench.
M_1—Temper directly after quench.
M_2—Refrigerate between quench and temper.
M_3—Refrigerate then double temper.
*—Three methods were used to determine retained austenite content.



HARDNESS: For 0 pct retained austenite, chart shows hardness needed to attain a fatigue strength of 150,000 psi as a function of carbon content.

nating retained austenite.

Clean Steels—What about inclusions? The report notes that inclusion counts were made for the four steels.

"These were taken on electropolished specimens and at five different locations over the specimen at 100X." Reported in the terminology recommended by the ASTM Standards for Ferrous Metals, "the inclusions were predominantly globular type oxides (D), thicknesses between thin and heavy, and density about 1. The counts indicated that all of the steels had very nearly the same quantity and distribution of inclusions."

From the standpoint of inclusions, these steels can be classified as above average in cleanliness. This eliminates an important variable and makes it possible to concentrate on the role played by retained austenite.

Strictly Physical — Transformation of retained austenite to untempered martensite is a diffusionless process that involves no chemical change. A strictly physical change, it results in a volume increase. Its contribution to fatigue failure appears to proceed in three stages.

First, there is slip and fragmentation. This continues until a maximum of cold work is reached. Next, high energy bonds within severely worked striations are disrupted. This leads to the formation of submicroscopic cracks. Lastly, the tiny cracks coalesce to form visible cracks and then—failure.

As a result of the NBS program, a number of important conclusions can be drawn. Microstructure, for example, does more to determine fatigue strength than moderate amounts of alloying elements other than carbon. "Fatigue strength is a linear function of hardness up to some limiting value which is a function of carbon content. Beyond this hardness, there appears to be a very rapid decrease in fatigue strength."

Freezing Helps — While marquenching is of no particular benefit, refrigeration prior to tempering definitely improves fatigue strength. (This should not be construed as an out-and-out endorsement of refrigeration. But where it can be properly and safely applied, it will prove beneficial.)

There seems to be a limiting value (to the amount of retained austenite) beyond which there is no further decrease in strength. There does not seem to be any lower critical value. Even one small patch of retained austenite — strategically located — can lower the fatigue strength.

Possible Trend — So much for the report's formal conclusions. They add up to the fact that designers and metallurgists would be well advised to keep retained austenite in mind when specifying steels for critical applications. On the negative side, this could result in a gradual veering away from some grades that are now in vogue.

Positively, it should help to develop a new degree of selectivity. It should uncover many high-strength steels that are far less prone to austenite retention. Some of these materials are now available but attract less attention than they deserve. A better understanding of retained austenite may reverse the prevailing trend and encourage the development of even stronger, more versatile steels.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

Controls Aid Refractory Output

In volume production of refractories, quality depends on controlling many variables.

Electronics has the flexibility and speed to keep up with the fast changes.

▪ Two factors form the basis for good fire-brick production: Control of physical and chemical properties and the ability to hold this quality day in and day out.

To meet such demands, Davis Fire Brick Co. sets electronics to work at its new plant at Oak Hill, O. The company produces dry-press, vacuum-pressed, de-aired and stiff-mud brick in a large variety of sizes and shapes.

Controls Moisture—At the wet pans where the clay is mixed, electronics controls moisture additions for constant tempering in batch after batch. A nozzle throws out a fine spray, while a moisture meter records moisture content. Materials are weighed electronically within ±1 pct of the desired amount.

In pressing, the green brick is only handled once to protect the brick from damage to edges and corners. To keep the supply to the presses above a preset amount, the presses are fed on a demand basis.

Colored lights indicate pressing conditions. This allows pressmen to correct any variations as they occur.

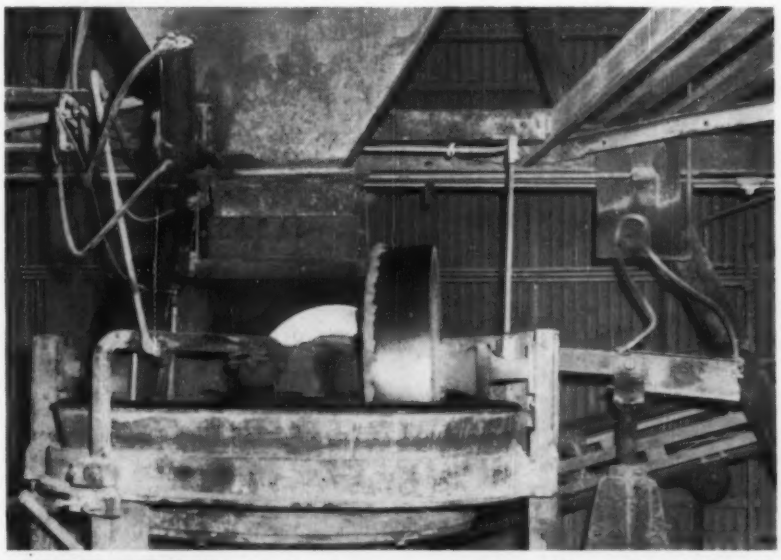
For burning, shuttle kilns take over. Being periodic kilns, they only resemble tunnel kilns in method of kiln-car setting or burning.

Uniform Burn—Each burn or load can be set to handle the quality of brick in the kiln. The units operate with low variation in temperature and produce uniform color. Burning time is shorter by weeks than that of either beehive or rectangular kilns.

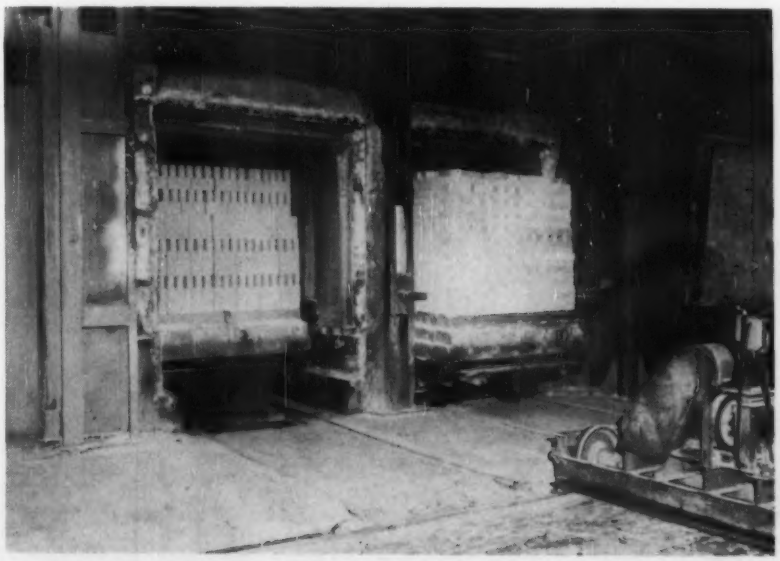
Each kiln processes about 60,000 bricks every three days. After a 30-minute downtime while the kiln is being drawn, the next load is in and under fire.

The drier for each kiln carries an equal amount of brick. After a burn is complete and ready for drawing, a total of 60 cars (20 in each position) move hydraulically to respective positions ready for shipping, burning or drying.

Electronic controls regulate the temperature cycle in the kilns and driers. It enables quick change of cycle to burn stiff-mud or dry-press brick of any size and volume.



PRECISE MIXING: As clay is processed, pipe with nozzle (left) adds moisture for controlled tempering. Electronic unit weighs clay mixture.



ADAPT TO LOAD: Electronics controls temperature cycle in the kilns and driers in adapting to various brick sizes and shapes.

Special Shot-Blast Machine Cleans Steel Ingot Molds

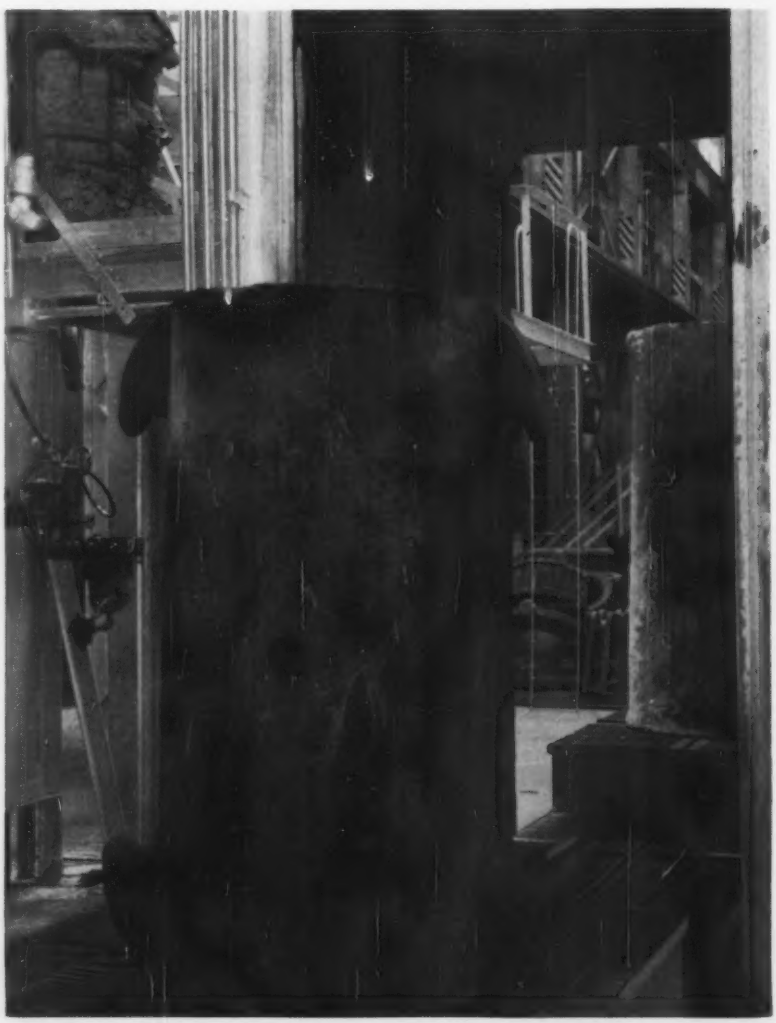
This specially designed machine cleans up to 56 steel ingot molds per shift.

Highly efficient, it easily tackles larger molds that were almost impossible to clean by hand methods.

By P. M. Unterweiser
Metallurgical Editor

▪ If you're interested in keeping your steel ingot molds clean (and what producer isn't?), the usual approach involves 1) a scratch brush with a long handle and 2) lots of "elbow grease."

It's slow, hard work—even to watch. And on the deeper molds, it's almost impossible to do a perfect job at the bottom of the mold regardless of time spent.



IN AND OUT: As a cleaned ingot mold leaves the shot-blast cabinet, another is ready to enter. Note the blasting nozzle suspended from the lance in the top center of the cabinet. Angular shot is used.

Better Cleaner—A specially designed, shot-blasting cabinet not only eliminates the drudgery of mold cleaning, but produces a mold surface that is cleaner and better in every way than anything ever attempted with the scratch brush. Such a cabinet is in daily operation in the electric melting department of Bethlehem Steel Company, Bethlehem, Pa. It has been turning out cleaner molds in jig time for more than a year.

Do cleaner molds result in cleaner steel?

"Very likely," says Mr. H. C. Bigge, Bethlehem's electric furnace and tool steel superintendent, "although it isn't the sort of thing we're prepared to prove. After all, we were cleaning our molds pretty carefully before we ever had the new machine.

"So it's mostly a matter of degree—and, of course, general efficiency. Now we're sure of even cleaner molds without tedious, manual labor."

Complete Coverage — The new mold cleaning unit is housed in a large steel cabinet. The molds are moved in and out of the cabinet, one at a time, on motor-driven platforms. The entrance and exit doors of the cabinet are also motor-actuated and provide a clearance of more than 9 ft above the platform level.

When a mold enters the cabinet, centered on its platform, it is carried to a position directly under a shot-blasting tube or lance. The entrance door is shut, and the lance begins its descent into the mold.

The lance assembly consists of a long steel tube with a shot-blast nozzle located at the working end. The nozzle contains four openings for distributing the steel shot. The entire lance and nozzle assembly

oscillates in a 90° arc eight times per minute. This oscillating motion provides complete shot coverage as the lance descends into the mold.

High Pressure—With both cabinet doors shut and the lance descending, shot pours from the nozzle under high (100 psi) air pressure. Four steady streams progressively blast the entire inner surface of the mold. When the nozzle approaches a point near the base of the mold, the shot-blast cuts off automatically.

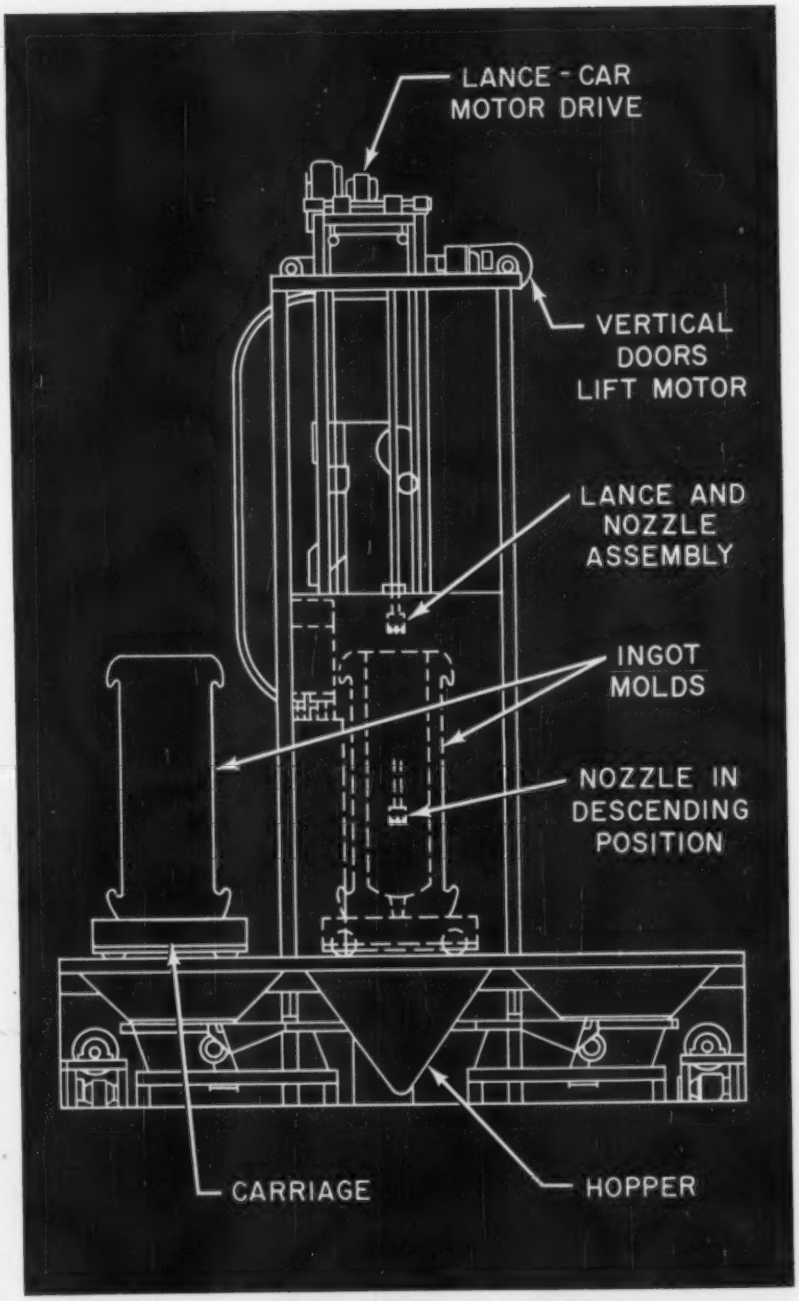
The descending speed of the lance can be varied from 2 to 6 fpm. At the Bethlehem plant, the lance is operated at the slowest speed to insure complete mold coverage. Even at this rate, the tallest molds (112 in. high) can be fully scanned in slightly under 7 minutes. Shorter molds can be cleaned in about 4 minutes. Mold cleaning production rates per shift are shown in an accompanying table.

Best Shot—Although the plant at first experimented with round, steel shot, it was discovered that angular shot was a more effective cleaner. A No. 14 angular steel shot is now used in connection with ⅜ in. nozzle openings.

All shot is collected and sifted clean in a pit located beneath the blasting cabinet. It is then conveyed to a main feed hopper, ready for re-use.

Controls for the cabinet and auxiliary equipment are located on a panel alongside the cabinet. Only a single operator is required at this panel.

Even though the new mold cleaning unit is operated at slowest speeds, its rate of production compares favorably with the most efficient manual cleaning that can be performed by four workers. Although four men can equal the machine's output at the beginning of a shift, their productive efficiency decreases as a result of fatigue. The quality of their work suffers accordingly.



OVERALL PLAN: Compactly designed, the shot-blast unit cleans one mold while another is placed in stand-by position on adjacent carriage.

Mold Cleaning Rates

Mold Sizes (inches)	No. Cleaned per Shift
24x63, 16x18	56
18x21, 21x67, 24x79, 28x51, 30x72, 30x86, 32x73	48
21x95, 24x111, 28x112, 34x104	40

How to Design Small Parts For Porcelain Enamel Finishes

By **R. J. Schlesser**—Sales Manager, Erie Ceramic Arts Co., Erie, Pa.

Modern, colorful porcelain enamels perk up the appearance of small parts with lifetime protective finishes. Here are some part-design tips to insure good enameling results.

▪ More and more product designers are choosing porcelain enamel as a finish for small parts.

They've learned that modern porcelain enamel finishes offer numerous excellent and, in many cases, exclusive advantages. And they've found that these benefits may be had at relatively low cost.

(By way of definition, "small parts" are not over 8 x 10 in. in area and do not weigh more than 2 lb.)

Rugged Material—Probably the greatest advantage of porcelain enamel is its near indestructibility under almost every type of condition. It is generally acid resistant, abrasive resistant, and resistant to mild alkalis. General duty coatings stand up well at temperatures up to about 1540°F, and are not affected by ultraviolet rays, dampness or humidity.

Porcelain enamel is also a nonconductor of electricity, yet it is an excellent thermal conductor, offering high emissivity. Further, it can provide either high or low light reflectivity, to suit the application.

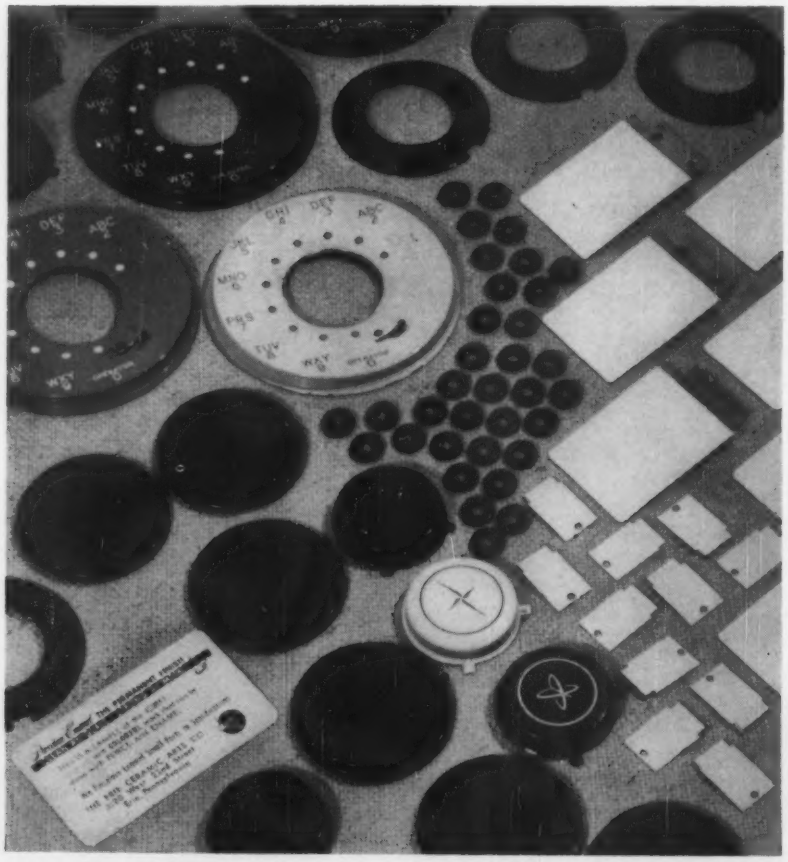
Finishing small parts with porcelain enamel can sometimes save on metal costs, too. Because the finish is stiff and corrosion resistant, a lighter gage or less expensive metal can often be used as a base.

Can Vary Formulas—Porcelain enamel can be formulated to embrace a wide variety of physical characteristics. Rarely, if ever, will only one characteristic appear in a given formula. If you need abrasion resistance, you will generally get impact resistance, heat resistance, corrosion resistance and other desirable properties for good measure.

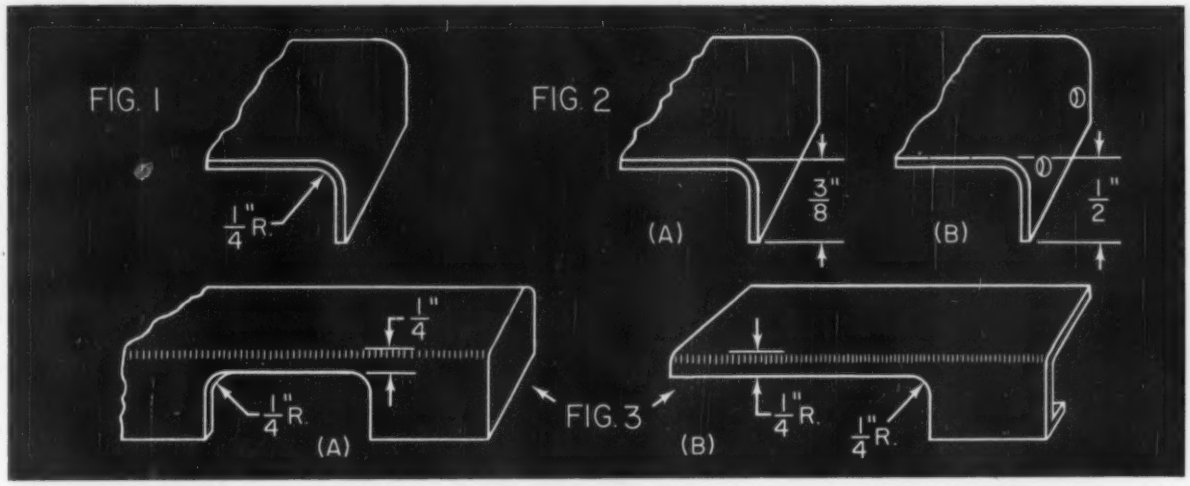
Almost any shade of any color can be achieved in porcelain enamel, and in either a gloss or matte finish. Designs, both decorative and instructional, can be silk screened on porcelain enameled parts with ease, then "fired" in to become as permanent as the cover finish itself.

Many Applications—Practically any small-part shape can be porcelain enameled. Many sheet metal and stamped products—telephone-number dials, instruction and escutcheon plates, thermometer faces, household utensils—are attractively and usefully coated in this manner.

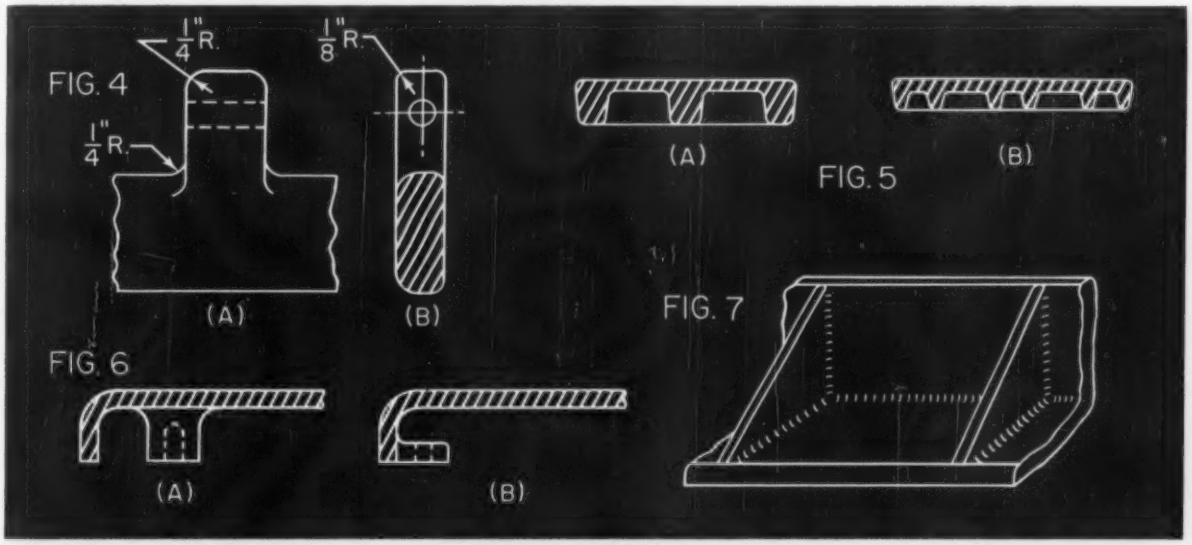
And the finish is just as appli-



USES UNLIMITED: A wide variety of small parts—stamped, cast, forged—are porcelain enameled with either general duty or special coatings.



NO SHARP TURNS: Stamped or formed workpieces should be designed to eliminate sharp radii on bends, sharp corners on cutout sections. Wherever possible, avoid holes, cutouts and notches in flanged sections.



CASTINGS AND FORGINGS: For porcelain enameling, designers should provide corner and fillet radii as shown, also keep sections uniform. Ribs or webs that are too deep or heavy are apt to cause hairlining.

cable to small ferrous and nonferrous castings and forgings. Cast valve bodies, porcelain enameled to resist corrosive media, are a good example of the former. And certain small, forged electrical fittings are similarly coated to increase their resistance to weather exposure, and to gain the insulating properties of the porcelain.

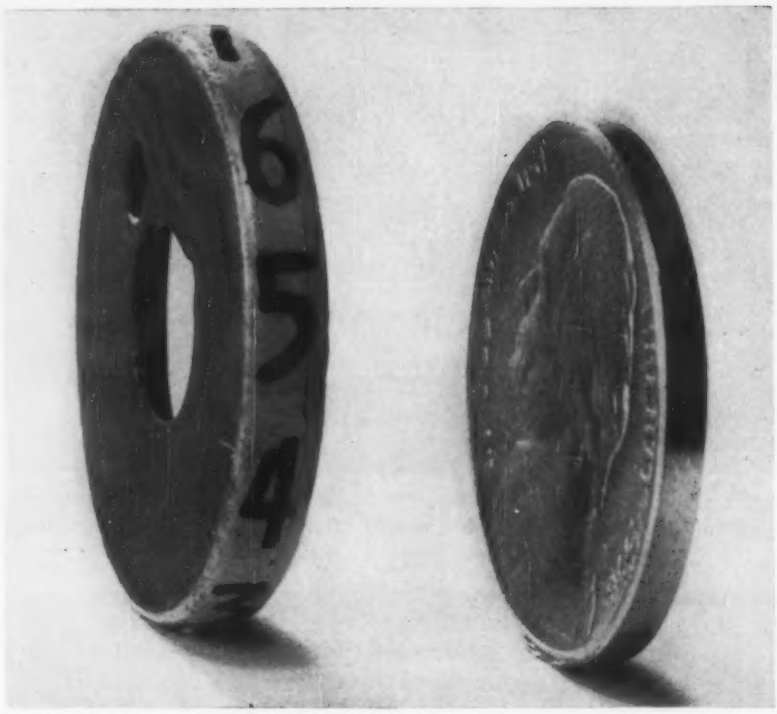
Some aircraft components—both cast and forged — are also being porcelain enameled to resist combinations of heat, corrosive atmospheres, and thermal shock.

Design Tips—There are some design limitations, however, which should be borne in mind to get the best results in porcelain enameled finishes.

On bent or stamped sheet metal parts, for example, the minimum bending or embossing radius is 3/16 in. It is better, though, if the radius does not go under ¼ in. for the average finish (Fig. 1). These minimums may be reduced when a highly opaque enamel or a dark ground coat is used, but the figure should never be less than 9/64 in.

When small sheet metal parts have plain flanges, flange width should be at least ⅜ in. (Fig. 2a). Flanges that contain holes or notches should not be narrower than ½ in. (Fig. 2b).

Care With Cutouts—It is best to avoid holes, cutouts, and notches if possible, as they tend to weaken the flange. Moreover, because such openings become areas of stress concentration, "hairlining" or chipping of the enamel is apt to occur



NEAT JOB: Computer wheel is only slightly larger than a nickel, yet porcelain enameled numbers are sharply defined and there to stay.

How Porcelain Enamel Performs

Property	Rating
COLOR AND SURFACE	
Color Range (decorative types)	Unlimited
Color Range (industrial types)	Limited
Fade Resistance (A and AA gloss finish)	Excellent
CORROSION RESISTANCE	
Rust Resistance (water to 150° F.)	Excellent
Acid Resistance (A or AA grades)	Excellent
Alkali Resistance (to pH 12 at 212° F.)	Excellent
Electrolytic Erosion Resistance	Excellent
Weathering (A or AA grades)	Excellent
ABRASION RESISTANCE (hardness)	
Moh's Scale	3½ to 6
Knoop Hardness	149 to 580
Sward Rocker	100 (same as plate glass)
Taber Abraser	8 to 74 mg weight loss at 10,000 cycles
THERMAL RESISTANCE	
Heat Resistance (800° to 1000° F.)	Excellent
Thermal Shock (Temp. drop of 350° F. or less)	Excellent
Heat Absorption	Good
Heat Reflectivity	Good
Cold Resistance	Excellent
PHYSICAL RESISTANCE	
Torsion Resistance (0.006″ coating)	Up to 70°
(0.009″ coating)	Up to 41°
(0.015″ coating)	Up to 32.9°
Radius Bend Failure	2.3″ r to 11.8″ r
Impact Resistance	Fair to Excellent
Stiffness	Good
Dielectric Strength	300 to 900v per mil
COEFFICIENT OF FRICTION	
High Gloss Finish	Low
Matte Finish	High
REFLECTIVITY	
Light Reflectivity (white opaque)	65% to 85%
Heat Reflectivity	Good

on the face of the part opposite the cutout.

If cutouts and notches cannot be avoided, they should have a radius of ¼ in. or larger, and ¼ in. of flange should remain between the top of the cutout and the face of the piece (Fig. 3a). The same considerations apply with variable-depth flanges; however, hairlining is apt to occur with this type.

How to Fasten—Several types of fasteners work well with porcelain enameled sheet metal parts. The list includes: self-tapping screws (most widely used), blind fasteners, spot welded clips, self - reaming screws, and spring steel push-on nuts. Washers, grommets or eyelets are often used to prevent chipping or crushing of the cover coat when fasteners are tightened.

Generally, corner welds are most common on porcelain enameled parts; however, a weld near, but not at the corner is less prone to chipping and hairlining. Peening the weld to a rounded inside and outside radius is desirable. Overlapping unwelded parts, widely spaced spot welds, and double thicknesses of metal should be avoided because hairlining may occur.

Hints for Castings—In designing castings or forgings to be porcelain enameled, the radius of curvature for corners and fillets is important. It should preferably be ¼ in., although a radius as small as ⅛ in. may be used if necessary (Figs. 4a, 4b).

Ribs and webs that are too deep or too heavy will cause hairlining (Fig. 5a). Fig. 5b is a better design, aimed at maintaining a uniform section thickness.

Heavy lugs on cast or forged parts (Fig. 6a) often cause the enamel to blister. A doubled tab as sketched in Fig. 6b should be substituted for lugs, if possible.

Where uneven strains are inherent in the part design, thin webs at the proper places may help reduce warpage and still permit satisfactory enameling (Fig. 7).

Isotopes Inspect Huge Castings

Resembling a giant one-eyed diving helmet, a low-cost gamma ray unit inspects castings in compact setup.

▪ Capable of handling a Cobalt 60 source of 1500 curies, a new radioisotope unit can radiograph up to 12-in. steel thickness to detect interior flaws. Previously it took X-ray machines in the 2-3 million-volt range to do the job.

Considered the highest capacity radioisotope machine installed to date in the U. S., it's now in operation at the Cooper Alloy Corp., Hillside, N. J. It forms a vital part in the company's production of stainless steel castings for nuclear work.

Tiny, but Potent—For its radiation source, the unit uses tiny wafers of Cobalt 60 no bigger than nickels. The powerful setup radiographs every segment of the company's heaviest castings on X-ray film.

As pointed out by Harry A. Cooper, president, "Nothing short of perfection can be tolerated in valves and fittings to be used in nuclear work, or in the castings we produce for many other industries. A valve carrying 2500 psi at 650°F, often carrying corrosive or radioactive material, cannot have even the smallest flaw in its metal."

Called Picker Cyclops, the machine was manufactured by the Picker X-Ray Corp., White Plains, N. Y., a subsidiary of C. I. T. Financial Corp. It's housed in a specially built blockhouse of 4-ft thick concrete to shield adjacent areas from gamma radiation during shots.

Remote Control—An overhead conveyor brings castings into the blockhouse. After the radiographer positions the Cyclops and the X-ray film, he clears the area and locks the doors.

From a lunch-box size control outside the building, the operator sets exposure time. The Cyclops automatically rotates the Cobalt 60 source inside the head to align it with the unit's eye.

On completion of shot, the isotope returns to its safe shielded position. It's only then that a radiation - monitoring device in the blockhouse unlocks the doors.

Fast Sequence — Since gamma rays leave no residual radioactivity, the next shot can be set up at once.

A radiograph is simply a shadow picture of the internal state of the metal. A flaw such as a void or crack permits gamma rays to stream through more freely and will show up on the film as a proportionately denser shadow.

The only other nondestructive way to test the big castings would be the use of a multi-million-volt X-ray machine costing many times as much as the radioisotope unit and still lacking the flexibility of the smaller machine. And it would be the size of a two-story house.

In addition to the giant Cobalt 60 unit, Cooper uses other units from Picker X-ray: two quarter million-volt X-ray machines and a portable radioisotope unit for radiographing thinner sections of metal.

SET UP SHOT: X-ray film taped inside matches pencilled markings. John Leask of Picker X-Ray readies casting for radiographic cycle.

Tungsten Is Forged, Extruded, Even Deep-Drawn

Because it's one of the toughest metals to fabricate, the feasible applications of tungsten have been relatively few.

Now the fabrication barrier has been broken for this valuable refractory metal.

▪ Tungsten is a refractory metal that melts at a temperature above 6000°F. With extraordinary ultra-high-temperature properties, it is a "natural" for such applications as rocket nozzles and re-entry nose cones.

Until recently, the use of tungsten was severely limited by fabricating problems that seemed insurmountable. But now the fabrication breakthrough is a reality. According to Fansteel Metallurgical Corp., North Chicago, Ill., tungsten can now be extruded, spun, forged—even deep-drawn.

The company has successfully fabricated actual tungsten parts by all of these techniques.

Major Breakthrough—"Up to the summer of 1958," comments R. W. Yancey, Fansteel's consulting metallurgist, "nobody knew how to fabricate tungsten in other than relatively simple shapes. Also, the ratio of cost to economical performance did not provide the incentive to develop new manufacturing techniques in wrought tungsten. Emphasis has changed rapidly in recent months and now it is being placed upon performance rather than cost. Now it appears that tungsten will assume an important role in rockets and space vehicles."

Temperature was one of the major barriers to fabricating tungsten. The metal must be fabricated at about 3000°F—a temperature at which stainless steel and some super-alloys melt.

Because of its low specific heat, tungsten tends to lose temperature rapidly. It will not retain heat the way steel does, for example. This presents another obstacle in fabrication.

Tough to Fabricate—Still other problems stem from the metal's low coefficient of thermal expansion and high-temperature brittle phase. As tungsten cools to 800°F, it loses ductility rapidly. If metal temperature falls below a critical minimum during fabrication, fracture will very likely occur.

This means that all of the tools used in fabricating tungsten must run hot. Tungsten carbide is used because of its extreme hardness, strength, and elevated temperature properties. Presses and other mechanical equipment must be fast acting. Even momentary delays may prove critical from the standpoint of temperature loss.

Tungsten forgings are made in a series of steps or sequences. Such procedure takes advantage of the metal's increased ductility as it is subjected to further working. The forging technique may be used for a simple rivet, the target in a new design of X-ray tube, the throat of a rocket nozzle, or one of a number of electronic tube components.

Even Tubing—Seamless tungsten tubing is produced by hot extrusion. In one typical application, the tubing was reduced by 70 pct of its original area. This indicates the extent to which hot tungsten metal will flow under proper conditions.

Extruded tubing can be further drawn to produce a thinner wall. Or it can be hot upset to make a special shape. It can even be cut

ALL FIRSTS: According to the developers, these parts have been fabricated for the first time by spinning from rolled tungsten sheet.

into slices for electrical contacts, small gyroscope rotors, or electronic tube components.

The process of deep-drawing tungsten is a "first" in this field. It opens the door to a variety of new applications. A deep-drawn tungsten boat, for example, makes it possible to fire electronic tube components to higher temperatures so that better tubes can be made. It offers the possibility of designing continuous metal evaporating equipment which will reduce processing costs.

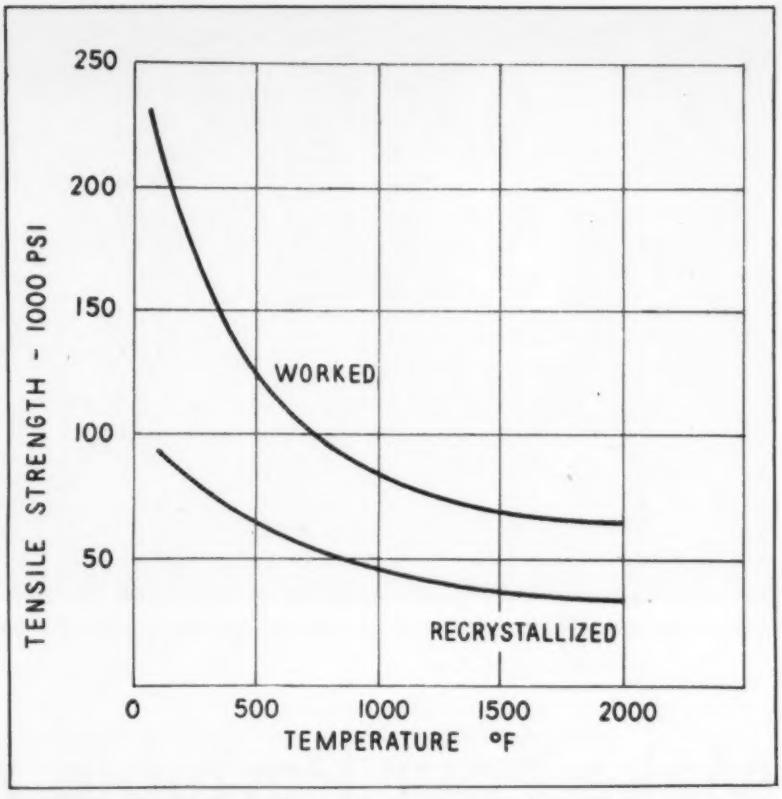
Key Applications—Deep-drawing and machining can extend the use of pure tungsten for gyroscope rotors. With a 20 pct increase in density over the tungsten alloys now being used, the drawn rotor may make it possible to decrease the size of gyro-controls and yet retain their operational integrity.

From the standpoint of reliability as a function of thermal expansion, the wrought tungsten rotor should have no equal. Tungsten has the lowest coefficient of thermal expansion of any of the metals used in rotor construction.

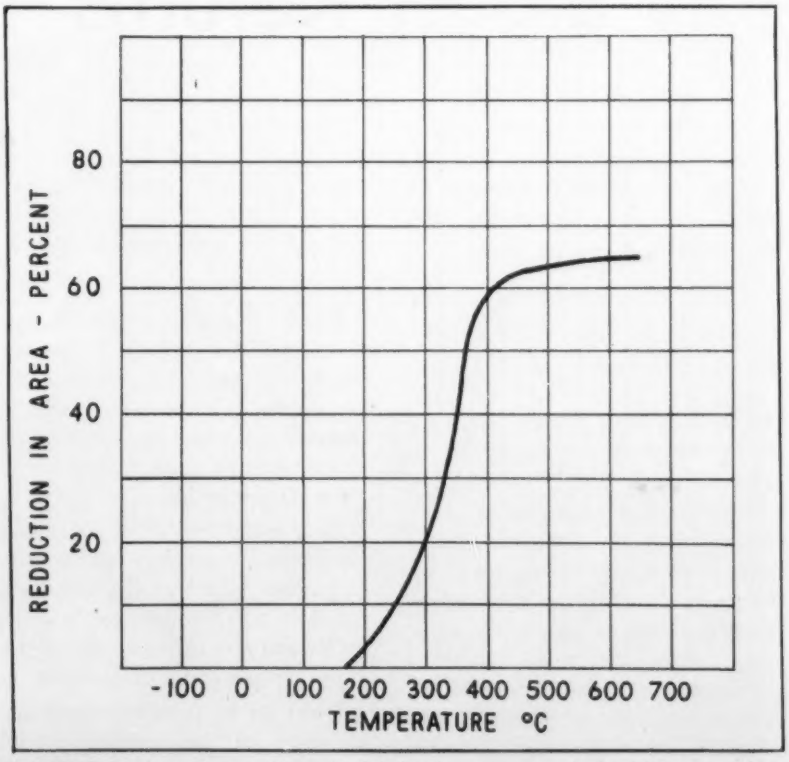
A hollow unit made up of two drawn tungsten cups brazed together with gold has interesting possibilities. About the size of a potato, the unit has a hole drilled in the bottom of one of the cups prior to assembly. It is a radioisotope container on a miniature scale.

Tiny Giant—Weighing only 5 lb, the unit is capable of a power output of 5 watts. The tungsten shell provides a suitable housing. This tiny unit is equivalent to 1450 lb of conventional batteries.

Fansteel has also succeeded in spinning a variety of shapes from rolled tungsten plate and sheet. This fabricating technique should prove most useful in the production of rocket nozzles and re-entry cones. As the burning temperature of rocket propellants increases, the need for higher temperature materials fabricated into many new shapes will have to be satisfied by metals like tungsten.



HIGH-TEMPERATURE STRENGTH: Tungsten is one of the strongest of all metals at elevated temperatures. It retains strength even at 2000°F.



BARRIER: A major problem in fabricating tungsten is its high transition temperature. It changes from a ductile to brittle state at 400°C.

PRESSURE CHECK: To accurately measure the air supply put a pressure gage between hose end and the tool.

Make Your Portable Air Tools Pay Bigger Returns

By **H. P. Bailey**—President, Rotor Tool Co., Cleveland

There are three basic ways in which air-tool users might get higher output in less time.

These approaches are simple and seem obvious—which is why they're often overlooked.

▪ Few people are aware of what it's really costing them to operate portable air tools.

The big item, of course, is labor. Actual cost is the number of operators, times the factor of use (how much of the day the operator is actually using the tool), times the wage rate.

Assume the operator gets $5000 a year, and that he uses portable tools 50 pct of the time. On this basis each portable tool costs $2500 a year to operate. It follows, then, that any boost in operating efficiency can add up to important savings, especially in plants having quite a few operators.

Check Pressure — One of the main (and most neglected) areas in which costs can be trimmed is the air supply. Maintaining enough pressure at the tool can easily mean up to twice as much output for a given amount of labor.

In a typical grinding operation, for instance, metal removal with 90 lb pressure at the tool is 109.2 oz per hour. If the pressure is only 60 lb, and this isn't rare, metal removal drops to 59.5 oz per hour.

Don't go by pressure shown on the gage of the compressor. In most plants, this pressure has been knocked down by restrictions in the air line, hose, couplings and the like.

The only way to be sure how much pressure is being delivered at the tool is to put an air gage on a tee between the hose end and the tool. Then, take a reading while the tool is running. Usually, it's a simple matter to bring the pressure back to 90 lb. Frequent checks will make sure it stays there.

Watch Maintenance — A second approach to getting more out of portable tools is to keep them in good order. Proper maintenance assures that all tools on the job are giving close to maximum, original power. This again might mean something like 20 pct more output per tool, or big labor savings on a given amount of work.

Check the actual power of tools on the job against the power of new tools or standards developed from testing new tools. A simple, practical device for this purpose is the prony brake shown in one of the photos.

Governed tools should be tested at 80 pct of the rated free rpm, tools not governed at about 50 pct. A simple scale reading is enough to show the general efficiency of the tool. For assembly tools, such as screwdrivers, nutsetters and impact wrenches, a Skidmore Wilhelm Tester or Livermont Analyzer will measure overall performance.

Regular Care—Set up a system of preventive maintenance. Bringing the tools to a central repair place on a periodic basis will cut down on maintenance and build up average power during use.

The repair shop should have a good-sized bench, a flowmeter for checking air consumption, tachometer, prony brake, and a good stock of all wearing parts. Keep a complete collection of parts sheets to speed identification and clarify parts ordering by correct number.

Portable tools, like any other machinery, must be lubricated on a regular schedule. Also keep tabs on the amount of general abuse portable tools receive in particular types of work.

When to Replace—Where repair parts amount to 50 pct or more of

How to Figure "Time to Repay"

Present Method:

Four hand tools, minutes required per unit	1.50

New Air Tool:

With hex chuck, minutes required per unit	1.05
Time saved, minutes	0.45

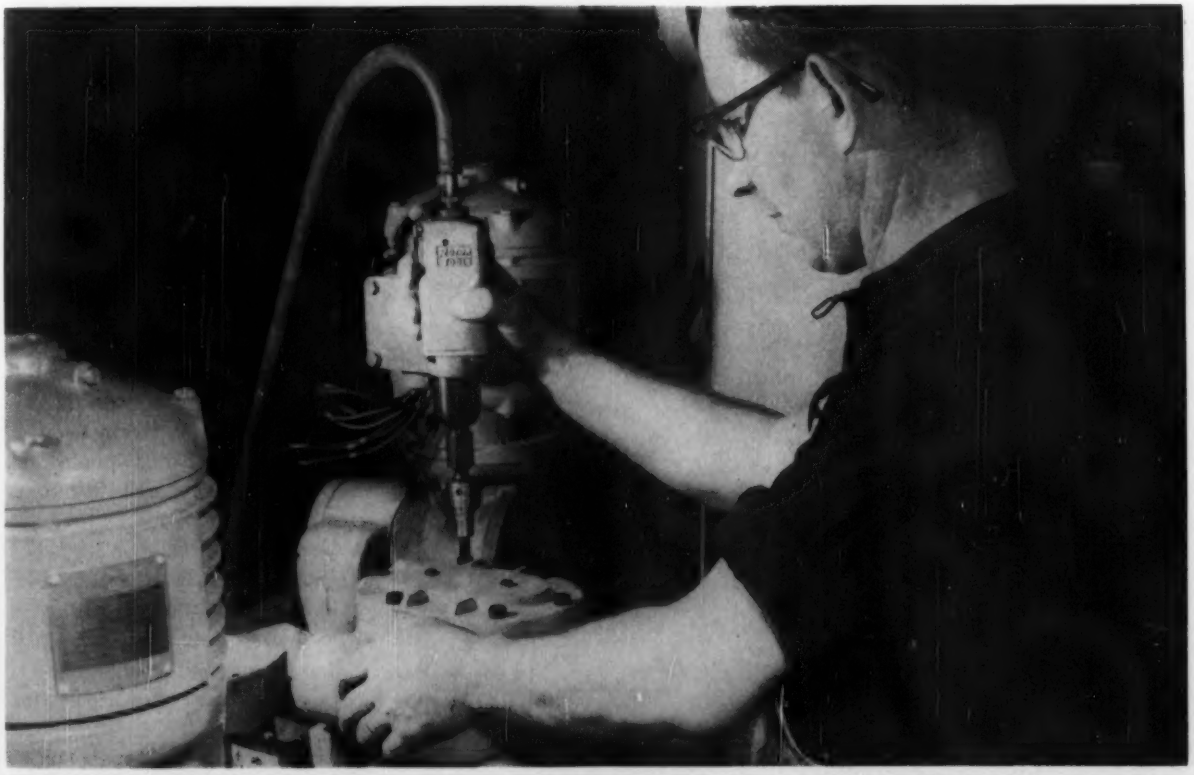
Savings divided by present time = 30 pct saving

Find out how much of the time the tool is actually used (assume for purposes of this example that it's 40 pct)

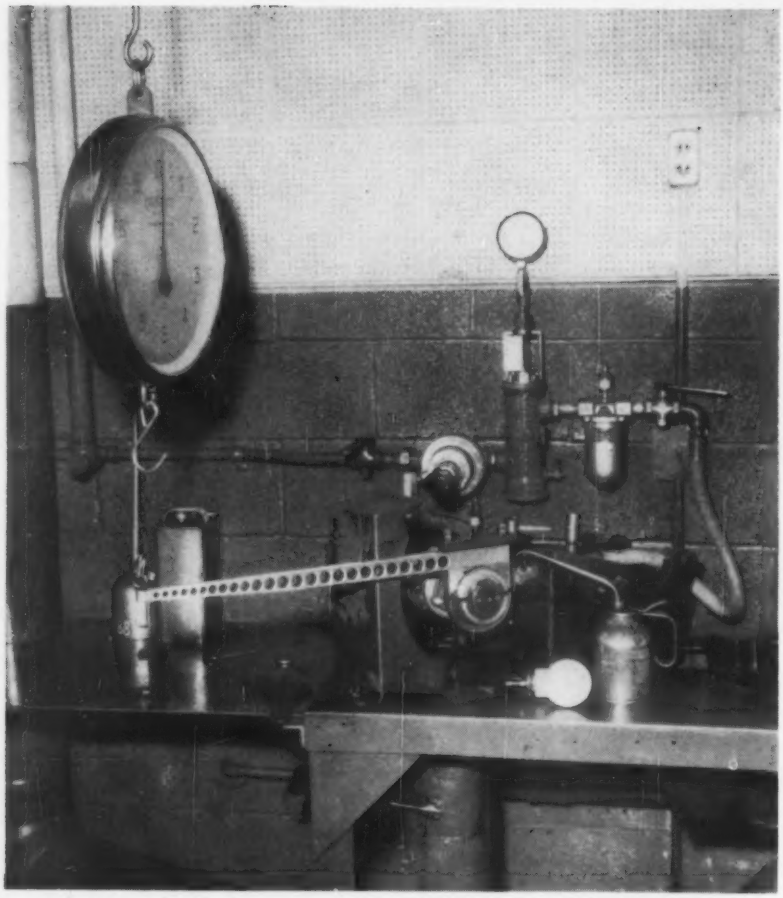
Then calculate as follows:

$$\frac{\text{price of new tool}}{\text{pct saving} \times \text{pct use} \times \text{hourly rate} \times \text{40-hr week}} = \frac{\$180.00}{0.30 \times 0.40 \times \$1.85 \times 40} = \frac{\$180.00}{\$8.88} = 20.3$$

20.3 weeks of use will repay cost of new tool



FAST WORK: Switch from hand tools to impact wrench cut labor 30 pct, paid for tool in just 20 weeks of use.



TEST FOR POWER: Simple prony brake checks actual power output. Air regulator, flowmeter and lubricator in background facilitate testing.

WELL EQUIPPED: Maintenance bench has cleaning tanks, arbor press, gages, tachometer, air supply and equipment for checking bent spindles.

the cost of a new machine, it may not prove worthwhile to repair the old one.

Many plants use a system of regular replacement to be sure their basic power is up to maximum production needs. Such a schedule may call for replacement of some machines every three years where the factor of use is high. Five years may suffice if maintenance is thorough and the tool is properly handled throughout this period.

The Right Tool—There's still another basic approach to upping efficiency and shaving costs: make sure the operator has the right tool for the job. It's always a temptation to try to make the tools on hand do additional jobs—work for which they may not be well suited in terms of size, speed or type.

In the long run, this is false economy. It pays to examine each job and check such things as tool weight, speed under load, feel of the tool in the operator's hands, and quality of finish, so that each operation is brought to maximum efficiency.

Surveys by portable tool makers have shown that an analysis of this sort usually raises production about 25 pct. This means yearly labor savings of $625 per tool. So, even if it's necessary to buy a completely new tool for a particular job, the outlay of about $185 is low in proportion to the return.

How to Figure It—Once a variety of individual operations have been sampled, it's possible to determine overall savings with the entire portable tool payroll. In each case, savings in an individual operation can be compared with tool cost to see if it pays to buy the tool. Set up "time to repay" schedules as in the accompanying sample; you'll find that even small improvements add up fast.

Many plants set up definite standards of time to repay as a basis for the purchase of tools. This gives shop management a practical standard toward which to work.

the most important advance in couplings since Sier-Bath's flangeless design!

new nyflex

Flexible Gear Couplings WITH NYLON SLEEVES

- No lubrication required
- Takes more misalignment than standard gear couplings
- Top performance in horizontal or vertical positions
- Weighs only 3½ pounds
- Low in price
- Speeds to 5000 rpm
- 1⅝" max. shaft capacity

ONLY 5 PARTS

Assembles, disassembles in seconds, no special tools needed!

This NYFLEX flexible gear coupling has a one-piece sleeve weighing only four ounces! The entire assembly, including high-strength steel hubs and retaining rings, weighs just 3½ pounds. It's the lightest, most compact flexible gear coupling you can buy. Another outstanding "first" from Sier-Bath, pioneer producer of flangeless, one-piece flexible gear couplings.

The NYFLEX coupling gives you several innovations in design and performance. It never needs lubrication . . . Takes almost 5° misalignment . . . Can be run equally well in either horizontal or vertical installations . . . Operating temperatures may be as high as 150°F. . Wide range of horsepower capacities and shaft speeds to 5000 rpm. And it's priced as low as *half the cost* of comparable all-steel couplings! Ten bore sizes available NOW from stock.

Bulletin N-1 gives the complete story of the new Sier-Bath Nyflex coupling. It's yours for the asking.

Sier-Bath

Founded 1905 Member A.G.M.A.

GEAR AND PUMP COMPANY, INC.
9243 Hudson Blvd., North Bergen, N. J.

WELDMENTS
Acme WELDING
DIVISION OF THE UNITED TOOL & DIE CO., WEST HARTFORD 10, CONN.
Machine bases, components, environmental and test equipment, pressure vessels . . . welded fabrications of every kind. Extensive cutting, forming, welding, X-ray and gamma ray equipment. Qualified welders. All recognized codes. Send your drawings and specifications to us for prompt detailed quotations.

New Patents In Metalworking

Pickling Solutions

Metal pickling solutions and methods, H. B. Bomberger and M. B. Vordahl (assigned to Crucible Steel Co. of America, Fleming, N. J.), Mar. 3, 1959. An aqueous solution for pickling alloys of titanium and zirconium without hydrogen embrittlement consists of 0.5 to 10-pct phosphoric acid, 0.5 to 10-pct fluoride ions, and 15 to 50-pct HNO_3 or 5 to 35-pct H_2O_2. No. 2,876,144.

Gun Barrels

Manufacture of gun barrels, J. D. Dickerson (assigned to Republic Steel Co., Cleveland, Ohio), Mar. 3, 1959. A steel of gun-barrel quality comprises 0.4 to 0.5-pct C, 0.4 to 0.9-pct Mn, up to 0.04-pct P, up to 0.04-pct S, 0.15 to 0.35-pct Si, 0.8 to 1.15-pct Cr, 0.3 to 0.4-pct Mo, 0.2 to 0.35-pct Va, the balance Fe. A mix of Ce and La, added to the molten steel, improves resistance to internal deterioration due to gun firing. No. 2,876,095.

Cold Working

Cold working metals coated with colloidal sulfur, F. Singer, Mar. 3, 1959. In cold working a metal article, the metal surface is contacted with colloidal sulfur and a lubricant. A protective coating of metal sulfide forms on the article. No. 2,876,148.

Non-Magnetic Steel

Non-magnetic austenitic steel, P. Payson (assigned to Crucible Steel Co. of America, Pittsburgh, Pa.), Mar. 3, 1959. A low-Ni, non-age hardenable and non-magnetic austenitic steel comprises 0.3 to 0.5-pct C, 11 to 15-pct Mn, 11 to 15-pct Cr, 0.15 to 0.5-pct N, up to 1 pct each of Ni and Si, the balance Fe. This steel remains non-magnetic on cold working. No. 2,876,096.

Solidifying Ingots

Method and apparatus for solidifying steel ingots, P. J. Hughes, Mar. 3, 1959. Method solidifies ferrous and nonferrous metal ingots, producing a more uniform crystalline solidification pattern. Dendritic crystalline patterns and gas voids are eliminated. No. 2,875,483.

Steelmaking

Continuous iron and steel making in a rotary vessel, S. G. H. Eketorp and S. H. Backstrom (assigned to Stora Kopparbergs Bergslags Aktiebolaget, Domnarvet, Sweden), Dec. 2, 1958. Continuously, this method refines molten iron or steel in a vessel which rotates on a vertical axis. Proportioned charge enters at the top; refined iron and slag simultaneously draw off through a bottom tapping hole. Withdraw rate automatically keeps molten mass at a predetermined level. No. 2,862,811.

Alloy Steel

Substantially nickel-free austenitic and corrosion resisting Cr-Mn-N steels, E. J. Dulius and P. Payson (assigned to Crucible Steel Co. of

America, Pittsburgh, Pa.), Dec. 2, 1958. This method replaces Ni of the well-known 18Cr-8Ni (AISI 300 Series) steel with other austenitic-forming and stabilizing elements. The alloy steel comprises 11 to 14-pct Mn, 14 to 18-pct Cr, up to 2-pct Cu, up to 3-pct Si, 0.15 to 0.40-pct N, up to 0.15-pct C, the rest Fe. The alloy has a wholly austenitic structure as quenched from 2300°F and good corrosion resistance at atmospheric pressure. No. 2,862,812.

Enameling

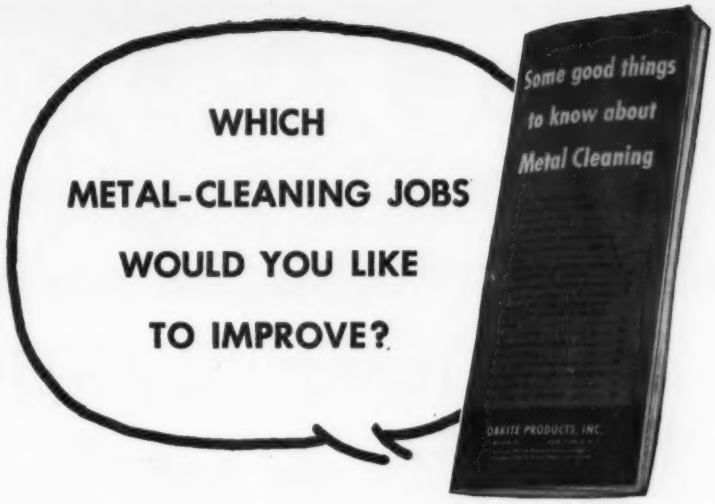
Pretreatment of iron or steel base for single coat vitreous enameling, L. M. Bernick, H. M. Roelofs and J. E. McFarland (assigned to Inland Steel Co., Chicago, Ill.), Dec. 2, 1958. With proper preparation, iron or steel need only a single coat of light-colored vitreous enamel. Base metal is coated (No. 2,862,-841) with an oxide of Ti, Sb, or W. It's heated in a non-oxidizing atmosphere to react the coating metal with the iron or steel. Alternatively (No. 2,862,842), Mo oxide or anhydride, either alone or with Ni or Co oxide, may be applied in like manner. It's unnecessary to apply a dark-colored enamel ground coat over such a base prior to the finish coat.

"Patent Review" appears in the third issue of The IRON AGE each month. Look for it in the April 16 issue.

Heat Treating

Method of and apparatus for heat treating parts, W. E. Engelhard, Dec. 2, 1958. Hardening steel parts especially ones of irregular shape, is done by heating and cooling. Heated parts rapidly quench. Then they're sealed within an enveloping shield. This contains some of the quenching medium. Further cooling of parts by heat transfer occurs very slowly. Thus, thicker and thinner sections of shapes cool evenly. Cracking and warping are about nil. No. 2,862,843.

Copies of U. S. Patents are available at a cost of 25¢ each from Commissioner of Patents, Washington 25, D. C.



¶ Are you cleaning metal in the most economical way? *See page 9 of Oakite's FREE booklet on Metal Cleaning.*

¶ Are you cleaning metal the fastest way? *See page 12.*

¶ Do you need room-temperature cleaning combined in one operation with temporary rustproofing? *See pages 12 and 14.*

¶ Do you know the advantages of alkaline pickling? *See page 21.*

¶ Have you compared the values of iron phosphate coating and zinc phosphate coating in preparation for painting? *See pages 22 and 25.*

¶ Can you use a cleaner that removes rust and oil at the same time; often eliminating all need for pickling? *See page 30.*

¶ Do you have trouble stripping epoxy resins, pigment residues, phosphate coatings and under-paint rust? *See page 31.*

¶ How do you clean parts that are too large to be soaked in tanks or sprayed in machines? *See page 31.*

¶ Are you getting full profit out of your finishing barrels? *See page 32.*

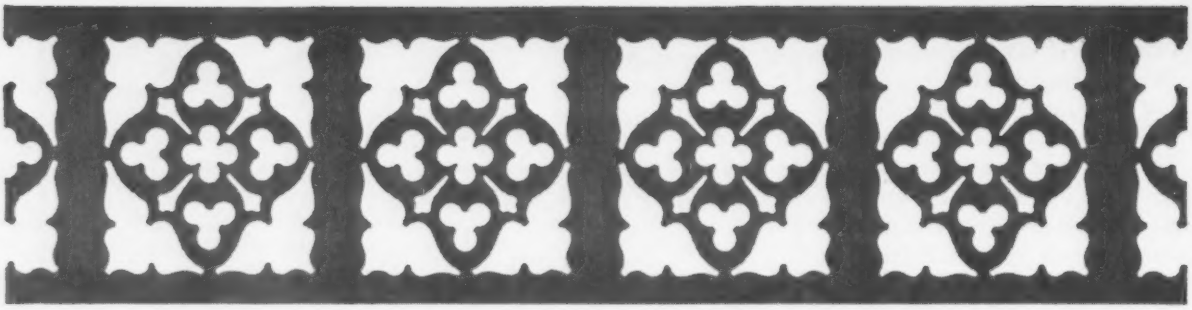
¶ What do you do when oversprayed paint neither floats nor sinks in your paint spray booth wash water? *See page 35.*

¶ Do you need better protection against rusting in process or in storage? *See page 37.*

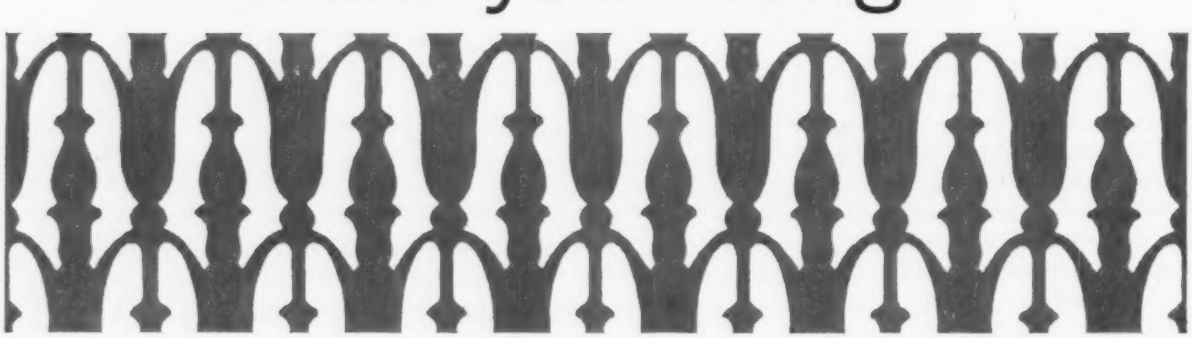
FREE For your copy of *"Some good things to know about Metal Cleaning"* write to Oakite Products, Inc., 30H Rector Street, New York 6, N. Y.

SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS · METHODS · SERVICE
SCIENCE

Technical Service Representatives in Principal Cities of U.S. and Canada
Export Division Cable Address: Oakite



make your design



shine with Hendrick

perforated metal

You may find just the perforated metal to top off your design when you look over the patterns that are exclusively made by Hendrick. These patented patterns are an important part of the Hendrick catalog, which contains more than 100 exclusive designs in all.

Hendrick Perforated Metal is furnished in every available commercially rolled metal. All can be supplied with varying numbers and sizes of perforations, in plain or panel effects.

All combine the functional and the decorative with low cost.

Write for free Catalog from Hendrick . . . the pioneer in perforated metals. This catalog can show you dozens of ways to make *your* design shine.

HENDRICK

MANUFACTURING COMPANY *37 Dundaff Street, Carbondale, Pa.*

PERFORATED METAL • PERFORATED METAL SCREENS • WEDGE-SLOT SCREENS • HENDRICK WEDGE WIRE SCREENS • ARCHITECTURAL GRILLES • MITCO OPEN STEEL FLOORING—SHUR-SITE TREADS • ARMORGRIDS • HYDRO DEHAZERS • DISTILLATION COLUMN INTERNALS

FREE LITERATURE

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 137.

Aluminum Forgings

Facilities, products and services of a giant aluminum forger appear in a 38-page booklet. Illustrated, it offers customers comprehensive engineering designs, metallurgical assistance and test services. (Aluminum Co. of America).

For free copy circle No. 1 on postcard, p. 137

Shop Layout

Listed in a 102-page catalog are 15,000 templets of most standard machine tools and shop equipment. For plant and shop layout planning, they are exact ¼-in. scale. All are accurately prepared from data supplied by machine tool makers and field engineers. (For free copy write on company letterhead to Repro-Templets Inc., Oakmont, Pa.)

Immersion Heaters

New high-efficiency immersion heaters are introduced in a 6-page folder. They come in steel, stainless steel and translucent fuzed quartz models. (N. J. Thermex Co. Inc.)

For free copy circle No. 2 on postcard, p. 137

O-rings

Design and uses of O-rings are covered in a 20-page booklet. (Garlock Packing Co.)

For free copy circle No. 3 on postcard, p. 137

Straighteners

Bar and tube machinery is described in an 18-page booklet. It highlights billet peeling and chipping, centerless turning, bar and tube straightening, stretch straightening, wire straightening and cutting, and roll grinding. (Blaw-Knox Co.)

For free copy circle No. 4 on postcard, p. 137

the right screwdriving bit can determine your fastening costs

The *right* screwdriving bit is designed for a specific screw size, then hardened and tempered for a specific type of screwdriving application.

With the *right* bit you'll assemble more products in less time, have fewer rejects, and drive more screws per bit.

The *right* screwdriving bit for your application will be found in Catalog 30-C, along with the complete line of Apex screwdriving tools . . . for use with all established makes of drivers . . . to drive Phillips, Frearson (Reed & Prince), Slotted, Clutch Head, Socket Head, Hex Head and even special types of screws. Write, on your company letterhead, for your copy.

APEX INSERT BITS (Used with Apex Bit Holders) for Phillips cross-recessed-head screws and bolts

POINT SIZES: #0 through #4

440 Series
Standard Length

SD-1055
For Limited Clearance

440 Series
Long Lengths

SD-333
Heavy Duty

Apex also produces magnetic tools, one-piece power bits, hand drivers and other types of tools to drive Phillips screws and bolts.

APEX FASTENING TOOLS

SCREWDRIVING • NUT RUNNING • SPECIAL

AMWELD®

always a dependable fabricator for WELDED PRECISION ASSEMBLIES

As a major supplier of millions of rings, bands and welded assemblies to the aircraft industry, American Welding developed highly successful techniques for producing circular parts and components. Today they are applying these skills to the problems involved in missile production. These facilities, which include metal forming, welding, and machining, are available on a sub-contract basis. Complete metallurgical and engineering staffs, plus a work force skilled in the fabrication and welding of stainless steel, titanium, aluminum, and heat-resistant alloys, are ready to work with you. And, along experimental lines, American Welding operates a separate department for exploring new possibilities of fabricating by welding.

If you would like to obtain complete information on the capabilities of American Welding and how we can be of assistance to you — phone or write today. Our local representative will be happy to call and discuss your requirements.

WRITE FOR COMPLETE INFORMATION

NEW 20-page catalog of Amweld Welded Precision Assemblies, Rings and Bands.

NEW booklet entitled, "HOW AMWELD FLASH BUTT-WELDED RINGS ARE PRODUCED".

THE AMERICAN WELDING & MFG. CO.
120 DIETZ ROAD • WARREN, OHIO

AMERICAN WELDING

FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Barrel Finishing

Barrel finishing machines described in a 4-page bulletin include: 14 standard, 2 small, 11 special units. Compounds and media also are covered. (King-Seeley Corp.)

For free copy circle No. 5 on postcard

Precision Lathes

Precision lathes made by Wade Tool Co., Waltham, Mass., are detailed in a 12-page circular. (Pratt & Whitney Co., Inc.)

For free copy circle No. 6 on postcard

Tube Benders

Bending equipment specially-built for missile and airframe makers appears in a 20-page booklet. Shown are machines which bend large pipe, tube, bars. Most meet particular needs of users. (Wallace Supplies Mfg. Co.)

For free copy circle No. 7 on postcard

Driller, Tapper

An 8-page bulletin describes a tape-controlled turret drilling, tapping and boring machine. It has an automatic, numerically controlled positioning table with a modified General Electric tape control unit. (Burg Tool Mfg. Co. Inc.)

For free copy circle No. 8 on postcard

Steam Heaters

Instantaneous heaters shown in a bulletin have an extra-large steam inlet area. Principal heater features include: unique location of steam inlet, beyond the tube bundle to prolong tube life; rugged steel shell construction; compact, simplified design; seamless, copper alloy U-tubes; and removable, pull-through tube bundles. (Industrial Div., American Radiator & Standard Sanitary Corp.)

For free copy circle No. 9 on postcard

Forging

A 40-page booklet shows facilities of a forging works. "So far as is known," says the booklet, "no other plant in the world is producing steel forgings of the nature shown here." High density alloys, stainless steels and high quality carbon steels are forged. (Special Products Div., Cameron Iron Works, Inc.)

For free copy circle No. 10 on postcard

Couplings

Couplings covered in a 20-page folder not only transmit torque between shafts, they also protect shafts, bearings and rotating elements of connected machines. They prevent damage from unavoidable misalignments caused by settling of foundations, wear of bearings, vibration, end float, etc. (Dominion Engineering Co. Ltd.)

For free copy circle No. 11 on postcard

Safety Grating

Safety grating covered in a 24-page catalog comes in two basic types. The first, in steel, aluminum or stainless, is of one-piece expanded metal construction. The other is welded, extra strong. (The Globe Co.)

For free copy circle No. 12 on postcard

Mill Products

Mill products of a major aluminum producer are reviewed in an 18-page brochure. It gives specifications for hundreds of alloys and forms. (Reynolds Metals Co.)

For free copy circle No. 13 on postcard

Diamond Tools

Quality diamond tools for many general and special applications are covered in a 20-page catalog. It points out these tools last longer and provide more efficient operation. This is due to selection of

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **3/19/59**

Circle numbers for Free Technical Literature, Design Digest, or New Equipment:

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90

If you want more details on products advertised in this issue fill in below:

Page .....Product .....

Page .....Product .....

Page .....Product .....

INVALID WITHOUT COMPANY NAME—TYPE OR PRINT

Name .....

Title .....

Product Manufactured .....

Company .....

Co. Address .....

.....

City ..... Zone .... State .....

FIRST CLASS
PERMIT No. 36
NEW YORK, N. Y.

BUSINESS REPLY CARD
No postage necessary if mailed in the United States

POSTAGE WILL BE PAID BY

THE IRON AGE
Post Office Box 77, Village Station
NEW YORK 14, N. Y.

FIRST CLASS
PERMIT No. 36
NEW YORK, N. Y.

BUSINESS REPLY CARD

No postage necessary if mailed in the United States

POSTAGE WILL BE PAID BY

THE IRON AGE

Post Office Box 77, Village Station

NEW YORK 14, N. Y.

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **3/19/59**

Circle numbers for Free Technical Literature, Design Digest, or New Equipment:

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90

If you want more details on products advertised in this issue fill in below:

Page ..... Product .....

Page ..... Product .....

Page ..... Product .....

INVALID WITHOUT COMPANY NAME—TYPE OR PRINT

Name .....

Title .....

Product Manufactured .....

Company .....

Co. Address .....

.....

City ..... Zone .... State .....

FREE LITERATURE

proper quality, size and shape diamonds and formulation of special alloys and setting materials. (A. Landau Co.)

For free copy circle No. 14 on postcard

Motor Controls

Motor controls are the subjects of an 80-page catalog. (The Arrow-Hart & Hegeman Electric Co.)

For free copy circle No. 15 on postcard

Fire Pump

Fire and low pressure (booster) pumps are described in new literature. These centrifugal double-suction, single-stage units are approved by Underwriters Laboratories or Associated Factory Mutual Fire Insurance Companies for heads from 50 to 145 psi, capacities from 500 to 2500 gpm. (Allis-Chalmers Mfg. Co.)

For free copy circle No. 16 on postcard

Brazing Stainless

Aspects of brazing stainless steels are discussed in a booklet. These include: (a) characteristics of base and filler metals; (b) brazing cycles; (c) selecting and using gas atmospheres; (d) construction and application of various type furnaces. (Harper Electric Furnace Corp.)

For free copy circle No. 17 on postcard

Lane Markers

Metalworking plants and warehouses needing lane markers now can get low-cost plastic ones. Instead of painting them on, you merely stick them to the floor. They outlast paint 5 to 1, says a folder which also describes several other pressure-sensitive "tape" products. (M & C Products Co.)

For free copy circle No. 18 on postcard

Smelting, Refining

Simple techniques for electric-furnace smelting and subsequent refining of almost any type iron ore are described in a 16-page brochure. It outlines advantages of the Strategic-Udy process. (Engineering & Construction Div., Koppers Co., Inc.)

For free copy circle No. 19 on postcard

Pulleys

Variable speed pulleys covered in a 12-page bulletin eliminate freezing and sticking. Five sheaves are rated for 2, 3, 5, 10 and 15-hp. Pulleys have no keys to obstruct oil flow around surfaces between the flange hug and sleeve. (T. B. Wood's Sons Co.)

For free copy circle No. 20 on postcard

Factory Trailers

Heavy-duty custom built trailers shown in an 8-page bulletin are for yard and factory service. Many types appear, capacities from 6 to 100 tons. (Easton Car & Construction Co.)

For free copy circle No. 21 on postcard

Numerical Controls

Automatic machine tool controls for micro positioning are featured in a 32-page bulletin. The numerical controls fit new or already existing machine tools. (Farrand Controls, Inc.)

For free copy circle No. 22 on postcard

Butyl Rubbers

Resistance to ozone and fire-retardant hydraulic fluids are key features of new butyl rubbers. Two new bulletins discuss these features. (Thiokol Chemical Corp.)

For free copy circle No. 23 on postcard

Recorders

Recording instruments announced in a data sheet measure pressure flow and other variables detected by three-terminal potentiometer (resistance) type transducers. (Leeds & Northrup Co.)

For free copy circle No. 24 on postcard

Pushbutton Actuators

Pushbutton actuators in a new series are announced in a data sheet. These actuators are for basic switches. (Micro Switch Div., Minneapolis-Honeywell Regulator Co.)

For free copy circle No. 25 on postcard

Riverside continuous casting saves you production time, cuts rejects

Brass and other copper-based strip, rod, and wire from Riverside produces consistently better end products for you—free of weak points that result in rejected pieces or whole batches.

How do we do it? By *continuous casting*, a process we introduced to this country—a process that eliminates air holes and impurities, leaving a dense, homogeneous casting for better wire-drawing and other fabrication requirements.

Get the full cost-saving story from *Riverside-Alloy Metal Division, H.K. Porter Company, Inc., Riverside, N.J.*

good riddance to "Swiss Cheese" castings!

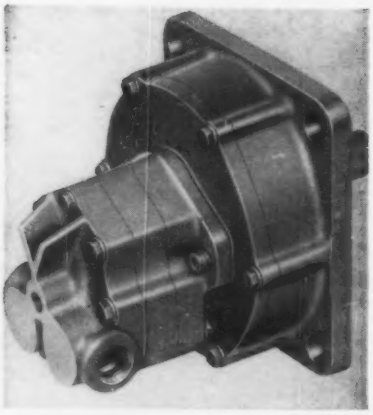
RIVERSIDE-ALLOY METAL DIVISION

PORTER

H.K. PORTER COMPANY, INC.

DIVISIONS: Connors Steel, Delta-Star Electric, Disston, Forge & Fittings, Leschen Wire Rope, Mouldings, National Electric, Refractories, Riverside-Alloy Metal, Thermoid, Vulcan-Kidd Steel, H. K. Porter Company (Canada) Ltd.

New Materials and Components



Hydraulic Motor Has Integral Gear Reducer

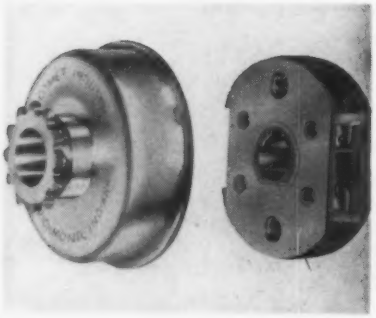
This hydraulic motor gear reducer consists of a gear type fluid motor mounted as a part of a planetary gear reducer. It's for use in driving rotary soldering, welding or heat treating fixtures; powering hoists, cranes or rope drives; turning turrets and platforms; driving elevators, conveyors, even earth augers. The reducer's high reduction ratio (4.6:1) assures smooth output even at lowest shaft speeds. Its components are designed to provide 150-ft-lb of output torque when used with an oil source capable of providing 1500 psi. The unit mounts on an SAE standard 4-bolt D size hydraulic pump mount. Over-all dimensions are about 8 x 8 in. The unit projects about 7½ in. from the mounting surface. (Webster Electric Co.)

For more data circle No. 26 on postcard, p. 137

Mounting Cuts Down Vibration of Equipment

This double extension, center bonded mounting cuts down severe vibration, shock and related disturbances. First use for such a mounting is in an engine suspension for a lawn mower. However, the basic design can apply to flexible suspensions for all types of mobile, transport - mounted and portable equipment. The mounting shows good radial flexibility and axial restraint. It absorbs torsional disturbances, distortion and relative motion without loss of stability. Of simple one-piece construction, it has an elastomeric flexing element permanently bonded to its steel inner member. Lubrication and maintenance is nil. (Lord Mfg. Co.)

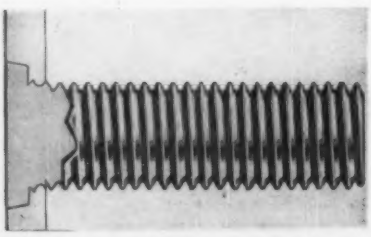
For more data circle No. 27 on postcard, p. 137



Centrifugal Clutches Fit 1 to 7-hp Engines

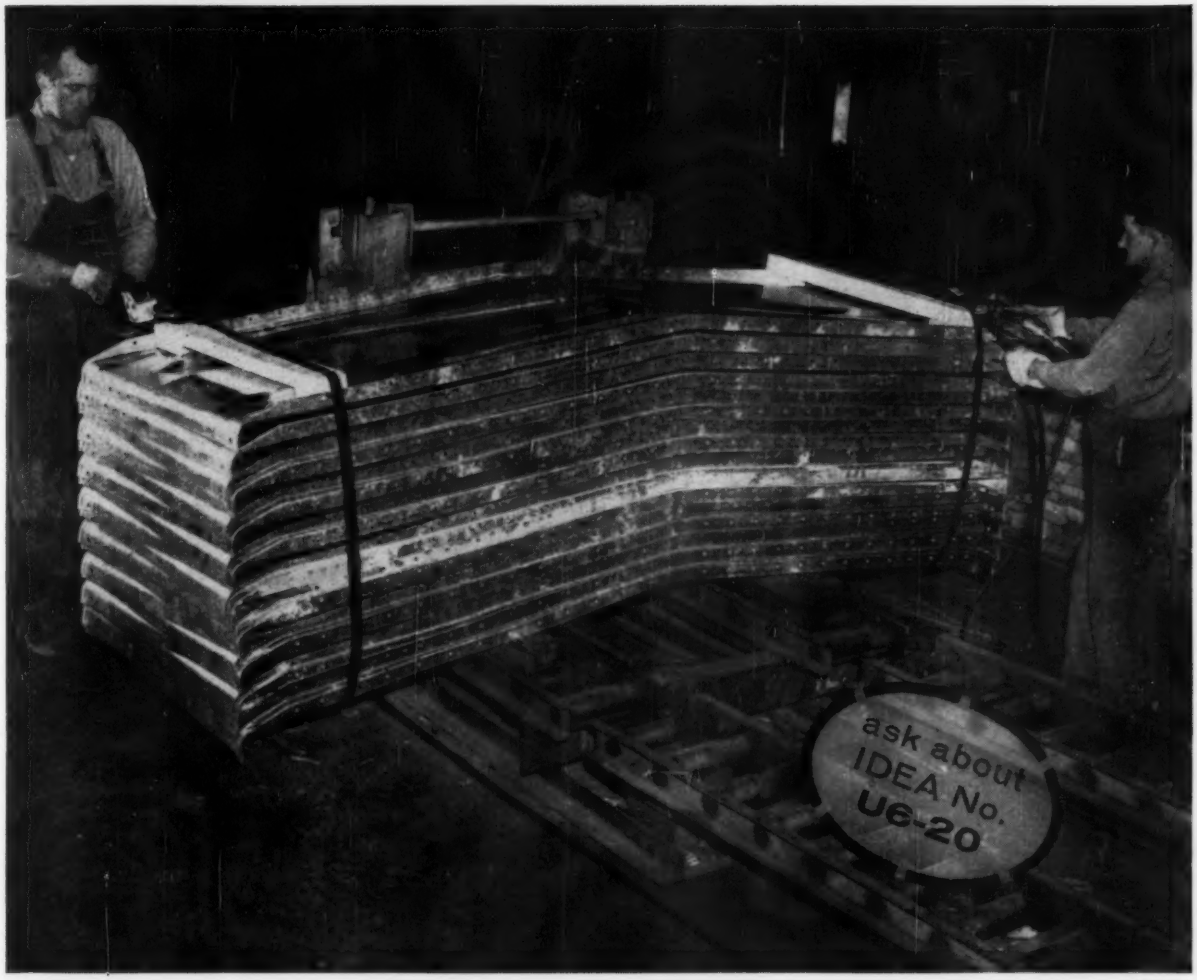
Automatic centrifugal clutch packages are being offered in a wide variety of sizes and types for engines in the 1 to 7 hp range. Shown is a semi-assembled unit for application where the size of sprocket or gear, as well as pulley, is of a small diameter. Or where a direct drive is desired without a jack shaft. Also where wear on the sprocket or gear is very extreme. This model is available with 12 tooth sprocket No. 35 chain or 10, 11 or 12 tooth sprocket in No. 41 chain. It's available with various bore sizes. All moving parts are heat - treated. (Comet Industries).

For more data circle No. 28 on postcard, p. 137



Self-clinch Studs Set Flush in Metal Panels

Self-clinching, new captive studs allow quick, easy, flush-head installation in metal panels. Panels can be of cold rolled steel, brass, copper, aluminum alloys or similar materials of 0.040-in. thickness up. The studs are simply dropped into punched or drilled holes. Then they're squeezed into place, one or several at a time, by standard pneumatic, hydraulic, or mechanical presses. Squeezing embeds the stud's head projections into the panel. Displaced metal flows smoothly, evenly



Check your AIM*...Standard Railway Equipment does...
Pneumatic tools speed unitizing operation

Acme Idea Man Andy Bassi helped develop a better unitizing method.

STANDARD RAILWAY EQUIPMENT MANUFACTURING COMPANY, HAMMOND, INDIANA, uses pneumatic stretchers to unitize freight car roof sections. Their Acme Idea Man suggested to this leading company that pneumatic stretchers would increase the speed and efficiency of the strapping operation. (Idea U6-20)

The pneumatic stretchers provide effortless, continuous strapping takeup to a pre-set, uniform tension. By tensioning steel strapping simultaneously around both ends of the units of roof sections, greater compression of the units can be obtained, enabling three of them to be loaded across the width of a gondola car. Strapping is used directly from the coil rather than in cut lengths, eliminating waste. The men find strapping quicker and easier to apply. Shipments move out of the plant faster, and arrive at their destination in excellent condition.

***Check Your Acme Idea Man.** His fund of knowledge may be what you need to help solve your materials handling or shipping problem. Call him at your nearest Acme Steel Office. Or write Dept. IFU-39, Acme Steel Products Division, Acme Steel Company, Chicago 27, Illinois. In Canada, Acme Steel Company of Canada, Ltd., 743 Warden Ave., Toronto 3, Ontario.

ACME STEEL **STEEL STRAPPING**

around the back tapered shank and annular groove; this creates a flush head and securely locks the stud into the panel with high torque and push-out resistance. Studs are made in steel and Type 305 stainless steel, in thread sizes from No. 4-40 to 5/16-18, lengths from ¼ to 1½ in. (Penn Engineering & Mfg. Corp.)

For more data circle No. 29 on postcard, p. 137

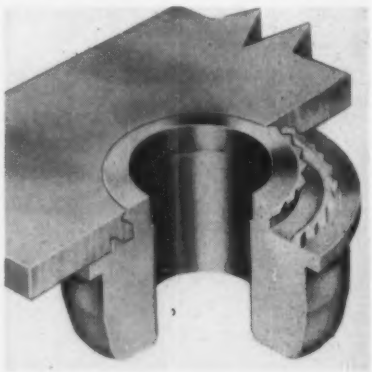
Servovalve

For industrial hydraulic control systems, a new servovalve features a two-stage, force balance feedback principle. It has a large, field-replacable filter integral within its rugged cast Meehanite body. The servovalve comes with either a standard connector or terminal box to accommodate the electrical input. Four sizes are available: 1, 2.5, 5 and 10 gpm with 1000 psi valve drop and 20 ma input. System pressures from 500 to 4500 psi may be used. (Moog Valve Co. Inc.)

For more data circle No. 30 on postcard, p. 137

Anchor Bushings

Press type anchor bushings provide a simple, quick, inexpensive way to make drill templates. The bushings are simply pressed into drilled or punched holes in 0.060 in. or thicker aluminum template material. A double row of serrations at the base of the bushing body pro-

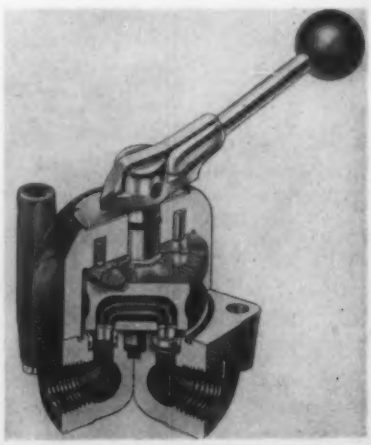


vides a positive lock into the template material to resist drill torque. Drill sizes No. 55 (0.052 in.) through 7/16 (0.4375 in.) are accommodated by only three bushing pilot sizes. (Hi-Shear Rivet Tool Co.)

For more data circle No. 31 on postcard, p. 137

Manual Valve

Lightweight and strong, this four-way manual valve is specifically for



use on oil sytsems with pressures up to 3000 psi. It will withstand proof pressures of 4500 psi and instan-

The best place to get the steel you want when you want it— is your LOCAL STEEL SERVICE CENTER

525 independent steel warehouse companies, which operate 900 separate steel service centers throughout the United States, maintain an $800 million inventory of more than 3,000,000 tons of steel in all forms, sizes, types, finishes and analyses. No matter where you are located, your local steel service center is best equipped to supply all your metalworking needs, both from the standpoint of economy and quick delivery. Some 15,000 metal specialists selling for these distributors are fully qualified to help you with your problems of selection and fabrication.

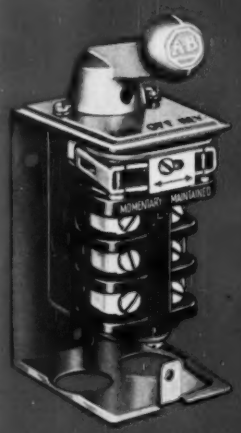
AMERICAN STEEL WAREHOUSE ASS'N.

STAINLESS STEEL is stocked in 252 of these Steel Service Centers, many of which carry MICROROLD Stainless sheet and strip made by the Washington Steel Corporation.

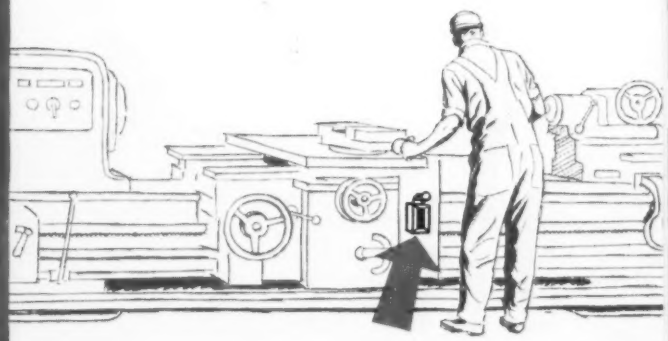
WASHINGTON STEEL CORPORATION
3-L Woodland Avenue · Washington, Pennsylvania

ALLEN-BRADLEY

REVERSING DRUM SWITCHES



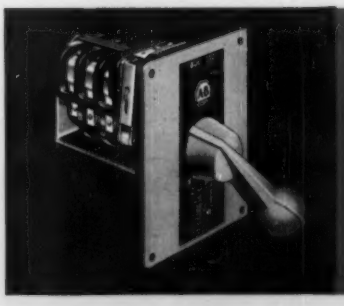
BULLETIN 350
Style A wrap-around cover is removed to show the readily accessible front wiring terminals. Max rating: 2 hp.



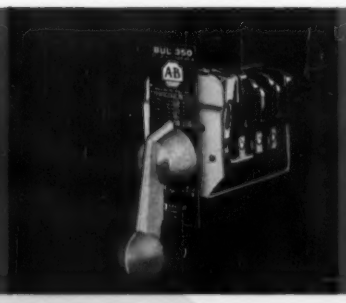
...styled to match the most modern production machines!

Inside and out—this Allen-Bradley drum switch is *all* new. Its trim, modern lines and attractive die-cast aluminum handle will give your production machines "up-to-the-minute" styling.

But there is more than beauty to this new switch. The rugged switch mechanism is a self-contained unit—independent of the enclosure. Misalignment and binding *cannot* occur. The base mounts directly on machine surfaces—without using spacers. And with the wrap-around cover removed, terminal screws are exposed for fast wiring—from the front. Changeover from momentary to maintained contact operation can be made in seconds. Investigate this new "leader" in its field. Send for Publication 6091.



OILTIGHT CAVITY MOUNTING
A-B Style AF reversing switches can be furnished with sealed shaft and rubber-gasketed, oiltight cover for cavity mounting in a machine base.



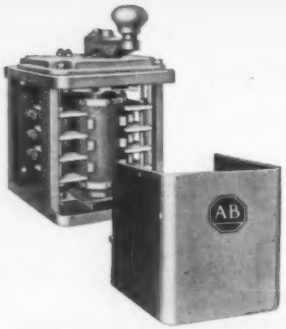
PANEL MOUNTING
The new Style A switches can be furnished for mounting directly on panels. Nameplate which gives ratings is also included with each switch.

ALLEN-BRADLEY

Quality Motor Control

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

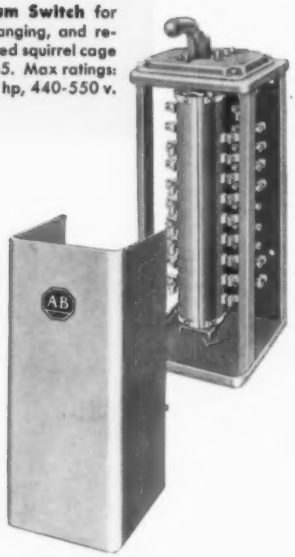
3-39-MR



Reversing Drum Switch for across-the-line starting and reversing a-c and d-c motors. Interlocks available. Bulletin 350. Max ratings: A.C. 20 hp, 220v; 40 hp, 440-550v. D.C. 3 hp, 115-230v.

Speed Regulating Drum Switch for starting and regulating duty of wound-rotor motors. Bulletin 375 non-reversing. Max ratings: 500 hp, 220-440-550 v. Bulletin 385 reversing. Max ratings: 60 hp, 220 v; 75 hp, 440-550 v.

Multi-speed Drum Switch for starting, speed changing, and reversing of multi-speed squirrel cage motors. Bulletin 365. Max ratings: 75 hp, 220 v; 150 hp, 440-550 v.



A-B QUALITY

For years of dependable performance

ALLEN-BRADLEY DRUM SWITCHES

have no equal!

These Allen-Bradley drum switches provide simple and economical control for alternating current motors. Although low in cost, these unusually rugged switches are built under Allen-Bradley standards of *quality* . . . your assurance of reliable, trouble free performance. And this broad line of drum switches offers a variety of mounting types, operating handles, and interlocks to satisfy practically every requirement. Let us send you details on this versatile line of drum switches.

ALLEN-BRADLEY

Quality Motor Control

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

3-59-MR

taneous surges of 9000 psi. Of high tensile heat treated aluminum, the valve boasts long operating life plus low maintenance costs. These are due to incorporating moving parts internally (detent disc, ball, and stops) so that they are constantly lubricated by the flow of hydraulic oil. Port sizes range from ¼ to 1 in. NPT with a rated flow from 7 to 38 gpm. (Barksdale Valves).

For more data circle No. 32 on postcard, p. 137

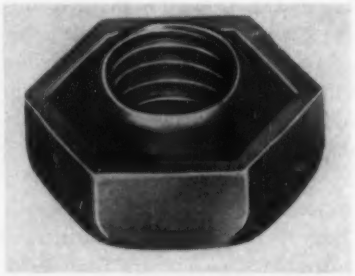
Rugged Switch

Highly resistant to shock, an environment-proof switch meets requirements of MIL-S-901B (Navy). These call for a 2000-ft-lb shock test without injury to the housing or the two enclosed single-pole double-throw switching units. The switching chamber is sealed and filled with an inert gas under pressure. This insures constant operating characteristics regardless of changes in atmospheric conditions. All exposed parts are treated to resist corrosion. Electrical rating at sea level or 100,000 ft is 28-v dc, 24 amp, inrush; 4 amp, resistive and 115-v ac, 5 amp, resistive. (Micro Switch Div., Minneapolis - Honeywell Regulator Co.)

For more data circle No. 33 on postcard, p. 137

Lightweight Locknut

High strength self-locking nuts are lightweight. Their "minimized hex" body has a fortified base ring.



This assures good thread load distribution; it also provides adequate bearing area for use even with soft metals like aluminum. As a result the locknut offers wrenching dimensions two socket sizes smaller than equivalent NAS or AN nuts. Reduced wrench size requirements make possible moving nut and bolt closer to the load center line. Hex dimensions are fully compatible with standard wrenches. The low height nut can be used to develop the full strength of 160,000-psi bolts, including the short thread NAS series. (Elastic Stop Nut Corp. of America).

For more data circle No. 34 on postcard, p. 137

Stainless Steel

Corrosion and heat resistant, a new stainless steel is available in forging billets and rounds from ⅜ to 3 in. Nickel content is low. Yet it remains completely austenitic in all conditions. The material is for use in the 900° to 1600° F range. (Armco Steel Corp.)

For more data circle No. 35 on postcard, p. 137

Profit from DoALL's better tools

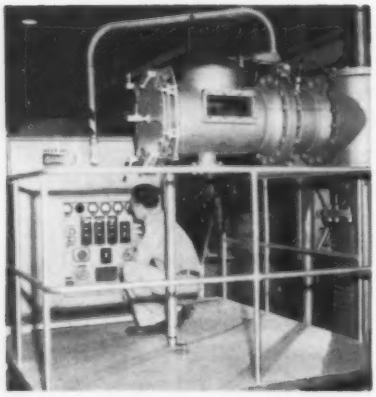
DoALL's 38 stores, staffed by factory-trained sales engineers and servicemen, bring you unequaled local service and lower distribution costs. One reliable source—one responsibility—for more than 1500 different quality products.

DoALL research and development have opened new frontiers in metalworking to help you produce better products at lower costs. Ask about new economies in band machining, surface grinding, gaging, cutting tools, etc. Call your local DoALL store.

Reach for Your DoALL Catalog

THE DoALL COMPANY
DES PLAINES, ILLINOIS

New Equipment and Machinery



Electron Beam Welder Joins Reactive Metals

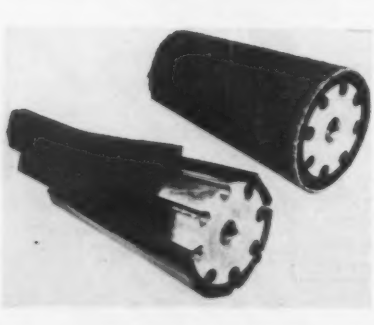
Using an electron beam as a welding tool, this welder joins reactive and high melting-point metals. Its high-energy electron beam effectively welds beryllium, molybdenum, tantalum, zirconium, hafnium, and other metals with nuclear reactor or missile uses. Such metals are difficult, sometimes impossible, to weld by conventional methods. Users of the new welder will need custom-built equipment for specific jobs. The electron beam bombards materials to be welded in a very high vacuum chamber. High vacuum prevents contamination of metal during welding. In fact, many contaminants originally in the workpiece disappear during welding. Size of the electron beam, small as 1/16-in. diam, can be accurately controlled. Resultant welds are strong, ductile. (Air Reduction Co.)

For more data circle No. 37 on postcard, p. 137

Electronic Gage Speedily Checks Parts' Hardness

A unique electronic gaging system lets this machine automatically check parts for hardness. Its outstanding features include: high speed, laboratory accuracy, extreme reliability, simple adjustment, and versatility. Parts automatically or manually orient and position on the conveyor. This carries them to the checking station. Here they transfer one at a time to the hardness-checking penetrator. A standard minor load applies and a clutch automatically sets the gage at zero. Then a major load applies. Depth of penetration causes voltage changes in a gage head. Segregating gates classify the tested parts into predetermined categories. Signal lights on the control panel give a continuous presentation of the entire operation. (Radio Corp. of America.)

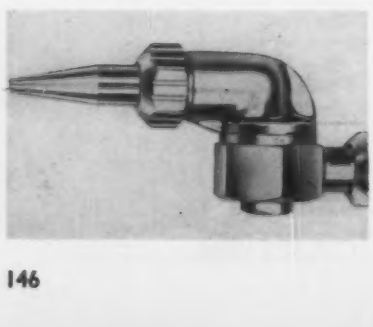
For more data circle No. 38 on postcard, p. 137



Expanding Cone Wheel Reduces Abrasive Waste

Abrasive waste resulting from finishing with cone wheels is reduced by a new expanding type cone. Abrasive sleeves remain on the wheel under practically all grinding conditions and speeds ranging from 2000 sfpm up. The cone has a machined aluminum core with individual rubber sleeves. Flexers lie flat when the cone is at rest. This permits easy placement or removal of the abrasive sleeve. When the cone moves, the flexers expand and grip the abrasive. (Nu-Matic Grinders, Inc.)

For more data circle No. 39 on postcard, p. 137



Attachment Lets Torch Swivel With Flame On

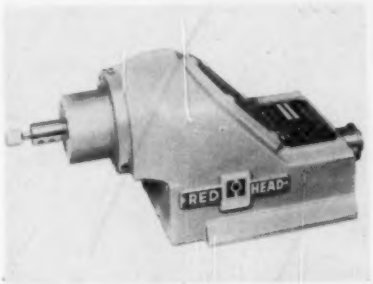
Operators now can change a torch's cutting angle without extinguishing the flame. It's done with a new attachment. Designed mainly for bevel cutting with a machine torch, the attachment has calibrations of 15 to 90° on each side of vertical. This permits cuts at most angles. Absence of stops on the swivel member also permits reverse beveling. Fexible seal rings imbedded in machined grooves keep

gases separated until they mix properly in the tip. The head swivels through its entire arc without extinguishing the preheat flame. The design also permits a change from bevel to vertical cutting and back again without a need for flame adjustment. (Smith Welding Equipment Corp.)

For more data circle No. 40 on postcard, p. 137

Hole Grinder

Grinding small holes at precise surface speeds is now possible without expensive high frequency generating equipment. It's done with new belt - driven interchangeable



cartridge wheelheads. These develop spindle speeds of 45,000 to 100,000 rpm. They grind small diameter holes where surface speed of the grinding wheel is critical. (Heald Machine Co.)

For more data circle No. 41 on postcard, p. 137

Belt Grinders

Centerless abrasive belt grinders of a new design precision grind and finish rod or tube stock at high speeds. Through feed rates range from 4 ipm to 40 fpm. Major feature of the wet-or-dry belt grinders is large work capacity. Each accommodates stock from ½ to 7-in. diam, up to 30-ft long. Abrasive belt size is 8 x 132 in., with belt speed of 4500 sfpm. (Engelberg, Inc.)

For more data circle No. 42 on postcard, p. 137

Inspection Table

Location of holes in templates, jigs, fixtures and other flat sheet metal work can be checked quickly and accurately with this inspection table. Hole center line distances (X and Y coordinates) from two

ROOFING and SIDING FASTENERS

The TOPSEAL System of Structural Fastening* combines Engineering Assistance with the highest quality fasteners; Power and Hand Tools; drill bits; special design sheeters sockets; and solid or "flexible flange" closure—all ready for immediate shipment. TOPSEAL* Fasteners arrive on the job with WEATH-R-SEAL® Washers assembled. Only genuine WEATH-R-SEAL® Washers have the metal and neoprene composition bonded together making a one-piece washer. So—when the fastener is driven, the sealing portion stays where it belongs—evenly distributed at the danger point where leaks must not occur. The "deflectible lip" of the neoprene composition (at inner ID) is directed into the hole sealing the fastener shank. TOPSEALS installed from the Weatherside eliminate straps, clips, and various bolts and nuts. Installation is as easy as . For new construction or maintenance—

"There's Only ONE TOPSEAL"

FABCO

Fastening Detail Manual on request

FABRICATED PRODUCTS CO. WEST NEWTON, PA.

Representatives in principal cities

*Trademark

earn a

$2,000 DIVIDEND
on PAYROLL DOLLARS/YEAR

with this **new** Impactool
in the hands of an operator

I-R's new ⅜" capacity Impactool has 40% more power than its predecessor. This new tool can help you achieve some quick cost reductions. If the tool operators in your plant are using older Impactools, you could increase their man-hour productivity by as much as $2000 Payroll Dollars per year for each operator, just by replacing the older tools with new I-R 804's.

Here's the way it works! Each of your tool operators probably earns about $5000 a year, but let's say he uses the tool 50% of his time. So $2500 of his annual wage is chalked up to tool operation. By boosting his productivity 40%, you are actually increasing his man-hour output by $1000 Payroll Dollars (40% x $2500). This dividend, or extra man-hour output, possible without adding to your present payroll, is your *Dividend on Payroll Dollars*. If you have 10 operators, that's a $10,000 Dividend.

The best way to fight today's higher production costs is to take the limitations off your man-hour output, and start earning your Dividend on Payroll Dollars.

The fastest, easiest way to do this is to call your Ingersoll-Rand Branch Office today! Or write Ingersoll-Rand, 11 Broadway, New York 4, N.Y.

Ingersoll-Rand

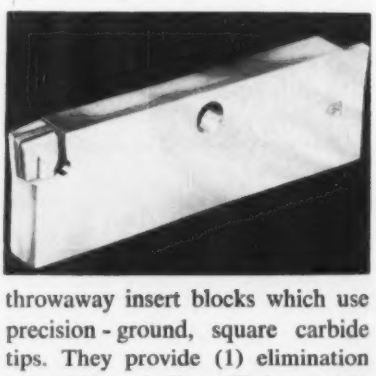
Tools plus AIRengineering increase output per man 8-909

edges of the sheet are read optically direct from decimally graduated scales. These dimensions may be read in 0.005-in. increments. The user can read these at the rate of one to three holes per minute. Highly skilled operators aren't needed to get accurate readings, either. The table allows inspection of material up to 36 x 42 in. And

it's done without need for angle plates, verniers, height gages, indicators or other such equipment often necessary for precision inspection. Likewise, there's no compensating of figures or other calculations. The table's scales are graduated to 0.050 in. Its scanner is for reading hole location to 0.0005 in. (Wiedemann Machine Co.)

Boring Tool

Advantages of carbide throwaway cutters now apply to block-type boring tools. The tools are



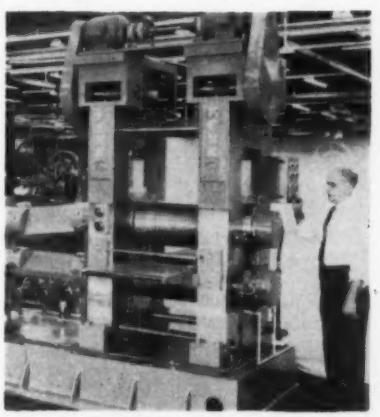
throwaway insert blocks which use precision-ground, square carbide tips. They provide (1) elimination of carbide grinding, (2) instant tip

indexing, (3) low cost per cutting edge, and (4) low tool inventory. Designed for use in standard block-type boring bars, the blocks come in two-cutter, as well as single-cutter micrometer-adjustable styles. Two-cutter blocks handle rough boring; micrometer - adjustable blocks do semi-finish or finish boring. Both are available with positive or negative rake. They cover a bore range of 2½ through 17 in. All blocks are hardened from 40 to 45 Rc to reduce chip erosion and prolong life. (Davis Boring Tool Div., Giddings & Lewis Machine Tool Co.)

For more data circle No. 44 on postcard, p. 137

Rolling Mill

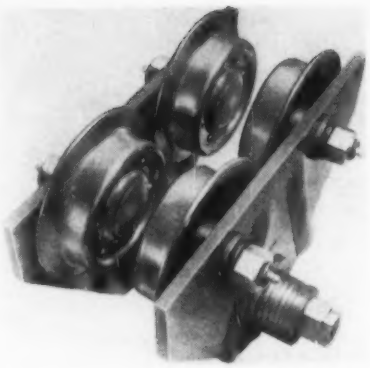
Hot rolling tungsten or molybdenum is the job of this two-high 12-in. reversing rod mill. Using 12-in. diam by 24-in. face special grooved rolls, the mill rolls 2⅛-in. diam billets to 1¼-in. diam. Production speeds range from 60 to 180 fpm. The mill features motorized screwdown; either simultaneous or independent infinite adjustment of each adjusting screw is possible via separate 3-hp motors. Its forced feed lubrication system has a lubricant reservoir self-contained in the heavy stress relieved steel bed. Power comes from a 70-hp variable speed fast-reversing dc drive. (Fenn Mfg. Co.)



For more data circle No. 45 on postcard, p. 137

Materials Handling

Tiny sparks can be very dangerous to some users of materials handling equipment. So one manufacturer's conveyors and chain-hoists now have trolley wheels of non-sparking beryllium copper. The non-sparking wheels carry heavy loads while resisting wear. The alloy is used only for the outer shell of the wheel, which serves both as a wearing surface and to separate the steel components from the steel track. (Saginaw Products Corp.)



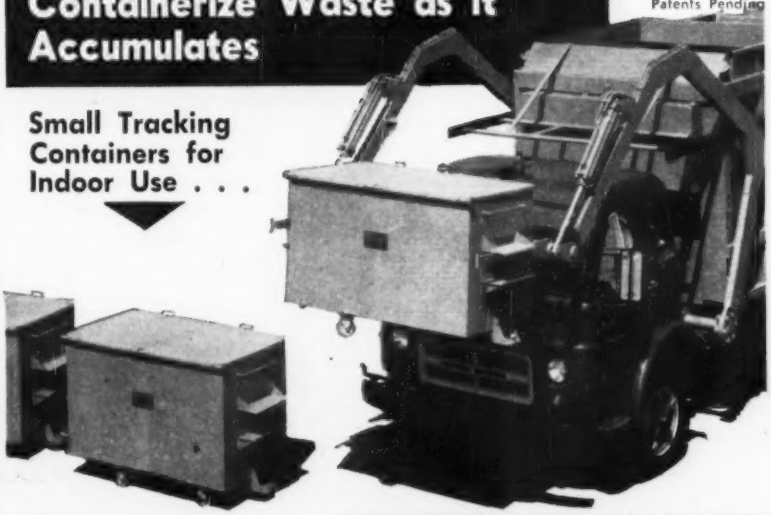
For more data circle No. 46 on postcard, p. 137

cut disposal costs by two-thirds . . .

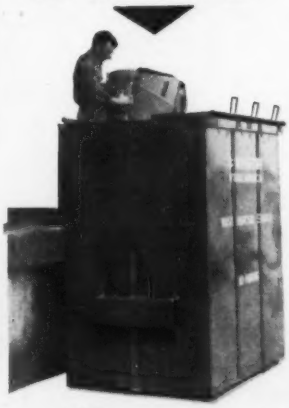
Containerize Waste as it Accumulates

Patents Pending

Small Tracking Containers for Indoor Use . . .



Large Containers for Outside Use



DEMPSTER-DUMPMASTER Handles SIX Sizes of Detachable Containers

Small one, two and three cubic yard tracking containers, which are towed, in train, to indoor waste accumulation points . . . large four, five and six cubic yard containers for outside waste storage . . . all are handled by the versatile new DEMPSTER-DUMPMASTER, the self-loading packer system that slashes your waste removal costs by more than two-thirds.

You can own this low - investment system, or contract with a Dumpmaster-equipped Private Hauler to place containers in your plant and empty them for a reasonable fee—his name on request.

Write For FREE BROCHURE

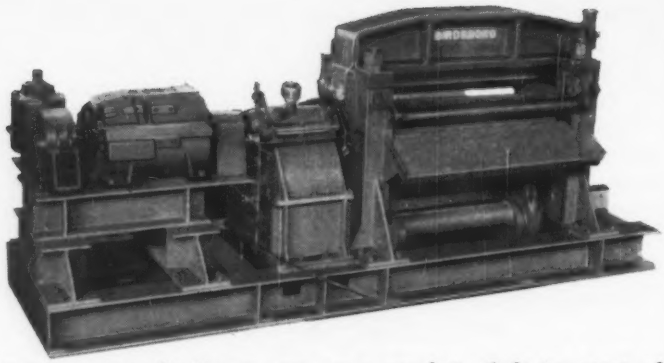
Mfd. By DEMPSTER BROTHERS Inc.

Dept. 1A-3 DEMPSTER BROTHERS, Knoxville 17, Tenn.

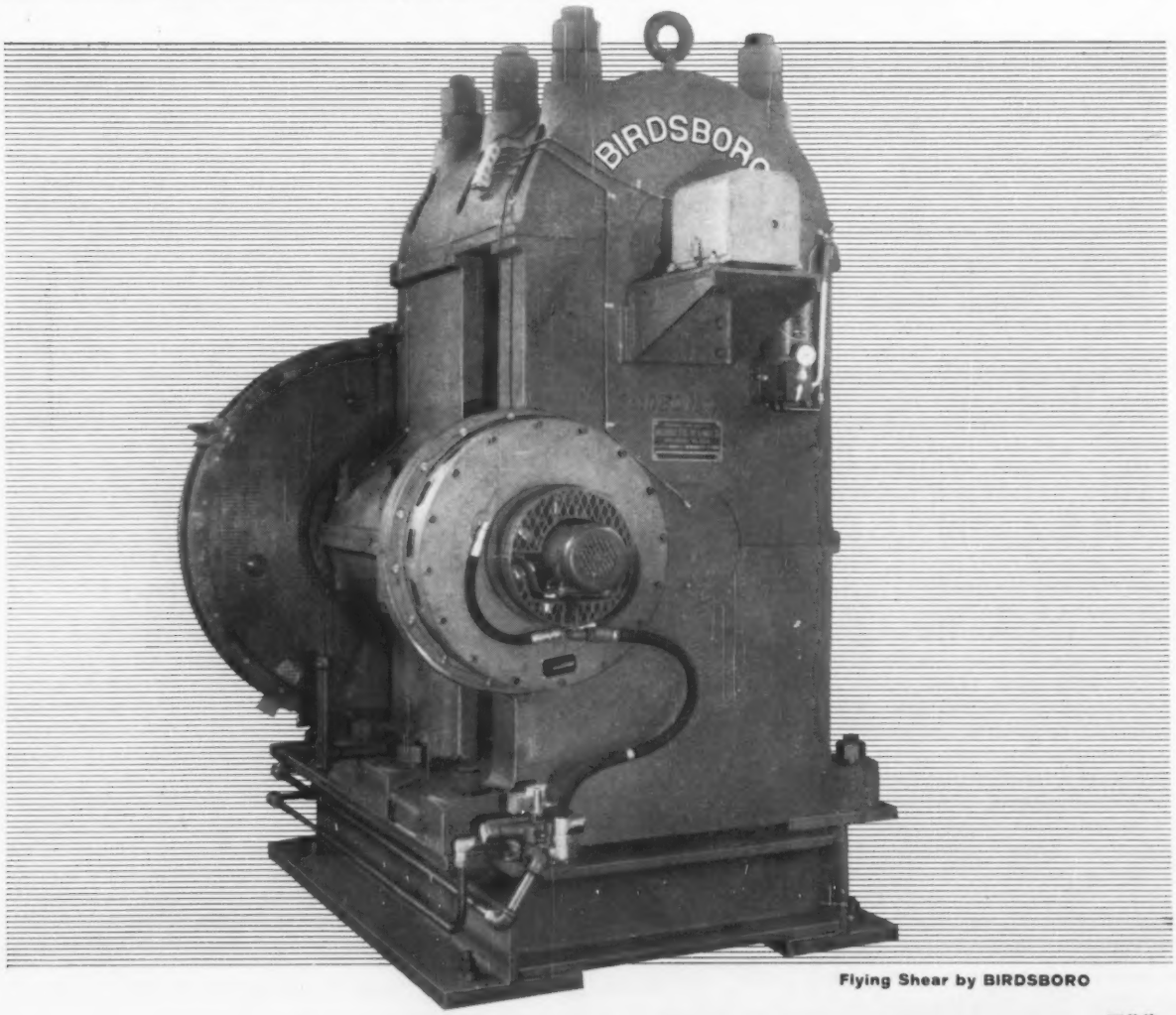
DEMPSTER DUMPSTER® SYSTEMS

BIRDSBORO

Customized Shear Designs pay off in higher productivity



● Like any other key piece of mill equipment, shears have been given a lot of BIRDSBORO's attention in recent years. As a result, many innovations are available to the mill operator that can eliminate former problems and provide a finer product at a lower cost. BIRDSBORO's shear case history book is a full one. In it you can see a number of firsts, some of them applicable to your operation. The BIRDSBORO representative can help apply creative engineering to your mill. *Sales Department, Engineering Department and Plant:* Birdsboro, Pa., *District Office:* Pittsburgh, Pa.



Flying Shear by BIRDSBORO

NM 73-59

BIRDSBORO

STEEL FOUNDRY AND MACHINE CO.

STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • STEEL CASTINGS • Weldments "CAST-WELD" Design • ROLLS: Steel, Alloy Iron, Alloy Steel

The Iron Age Summary

Feast-and-Famine Year for Steel

Steel market will blow hot and cold regardless of whether there is a strike.

If strike comes, output will be lost; if there is no strike, buying will ease.

▪ This will be a feast-and-famine year for the steel mills regardless of whether there is a steel strike.

The mills are having their "feast" in the first half of the year as their customers load up with inventory due to uncertainty of the steel labor outlook.

But in the second half, here's what will happen:

If there is a strike—The mills, of course, will lose production that would be very hard to make up. Once a strike starts, it usually takes a while for both sides to cool off enough to get down to brass tacks. Some observers believe a walkout could last as long as eight weeks.

If there is no strike—A peaceful settlement of steel labor issues would mean a sudden letdown in steel demand in the last half of the year. Steel users would no longer have to worry about building inventory. In fact, they most likely would pare expenses by again cutting back on their steel stocks.

Some steel analysts say the market will fall flat on its face in the last half if there is no strike.

These observers look at it this way:

A Look Ahead—At the present rate of steel consumption, the metalworking industry is expected to add 7 to 9 million tons of steel stocks in the first half. The buildup will leave plants with 20 to 22 million tons of steel inventory by the end of June. A labor settlement would bring a quick end to inventory buying.

Steel output may average about 90 pct of capacity during the first half of the year. But last-half production could drop drastically, depending on general business conditions, and how labor negotiations turn out.

Demand Broadens—Meanwhile, strong demand has spread even to products that heretofore had been little affected by strike-hedge buying. For example, the mills are about booked to capacity on railroad products through June. This includes wheels, axles, rails, and track materials. Up to now, the railroads have been lagging.

For most products, the mills are booked to capacity, or could be, on first half. Where they are not, it's merely a matter of holding space for valued customers who will firm up their specifications on the basis of their own production outlook.

Strictly a Hedge—There is some booking for third quarter delivery, but this is on a strictly hedge basis. If there is no strike, some of this tonnage probably will be cancelled. If there is a strike, the customer will hope to get delivery after the strike ends.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,618	2,604	2,449	1,417
Ingot Index				
(1947-1949=100)	163.1	162.1	152.5	88.2
Operating Rates				
Chicago	93.0	94.0*	88.0	55.0
Pittsburgh	94.5	91.5*	84.0	56.5
Philadelphia	98.0	97.0	93.0	56.0
Valley	83.0	84.0*	84.0	41.0
West	91.0	87.5*	85.0	73.5
Cleveland	96.0	93.0*	84.0	31.5
Detroit	99.0	100.0*	97.0	42.0
Buffalo	105.0	105.0	102.0	37.0
South Ohio River	87.0	93.0*	99.0	53.5
South	90.0	88.0	79.0	47.5
Upper Ohio River	97.5	93.0	87.5	75.0
St. Louis	81.0	80.0*	84.0	69.0
Aggregate	92.5	92.0	86.5	52.5

*Revised

Prices At a Glance

(Cents per lb unless otherwise noted)	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	5.967
Pig Iron (gross ton)	$66.41	$66.41	$66.41	$66.49
Scrap No. 1 hvy (Gross ton)	$40.83	$41.17	$43.83	$36.33
No. 2 bundles	$28.67	$29.00	$30.33	$27.17
Nonferrous				
Aluminum ingot	26.80	26.80	26.80	28.10
Copper, electrolytic	31.50	31.50	30.00	25.00
Lead, St. Louis	11.30	11.30	11.30	12.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	103.50	102.75*	102.75	95.00
Zinc, E. St. Louis	11.00	11.00	11.50	10.00

How to Use and Maintain a Scale

Industrial scale owners can do a lot to get better value from their equipment, weighing authorities say.

Some advice: Install scales properly, check them frequently, and teach personnel how to use them correctly.

▪ Weighing authorities have this advice for scale buyers and users: (1) Make sure improper installations don't shorten scale life and lead to weighing inaccuracy, (2) inspect and test scales continually, and (3) train and supervise weighing personnel carefully.

Install Them Correctly—Careless scale installation is condemned by Howard E. Crawford, head of weights and measures in Jacksonville, Fla.

"In many industries," he says, "floor trucks and other vehicles run over platform scales even when loads are not being weighed. This weight load is damaging to the weighing device."

Mr. Crawford adds, "The most common cause of scale errors is excessively-long use after all parts have been worn beyond reasonable repair."

Test Them Often—Frequent testing is recommended by another expert—J. J. Leonard, director of weights and measures of the State of New York.

"The more often a scale is tested," Mr. Leonard says, "the better return the owner gets and the better weighing. It doesn't make a great deal of difference whether weights and measures officials or regular scale attendants do the testing as long as the same goal is reached."

HANDLE WITH CARE: Scales will give better service if they are carefully installed, constantly checked, and properly manned, weighing officials point out. (Photo from Toledo Scale Co.)

And Train Users—Proper training of those doing the weighing is stressed by Rollin E. Meek, head of weights and measures in the state of Indiana.

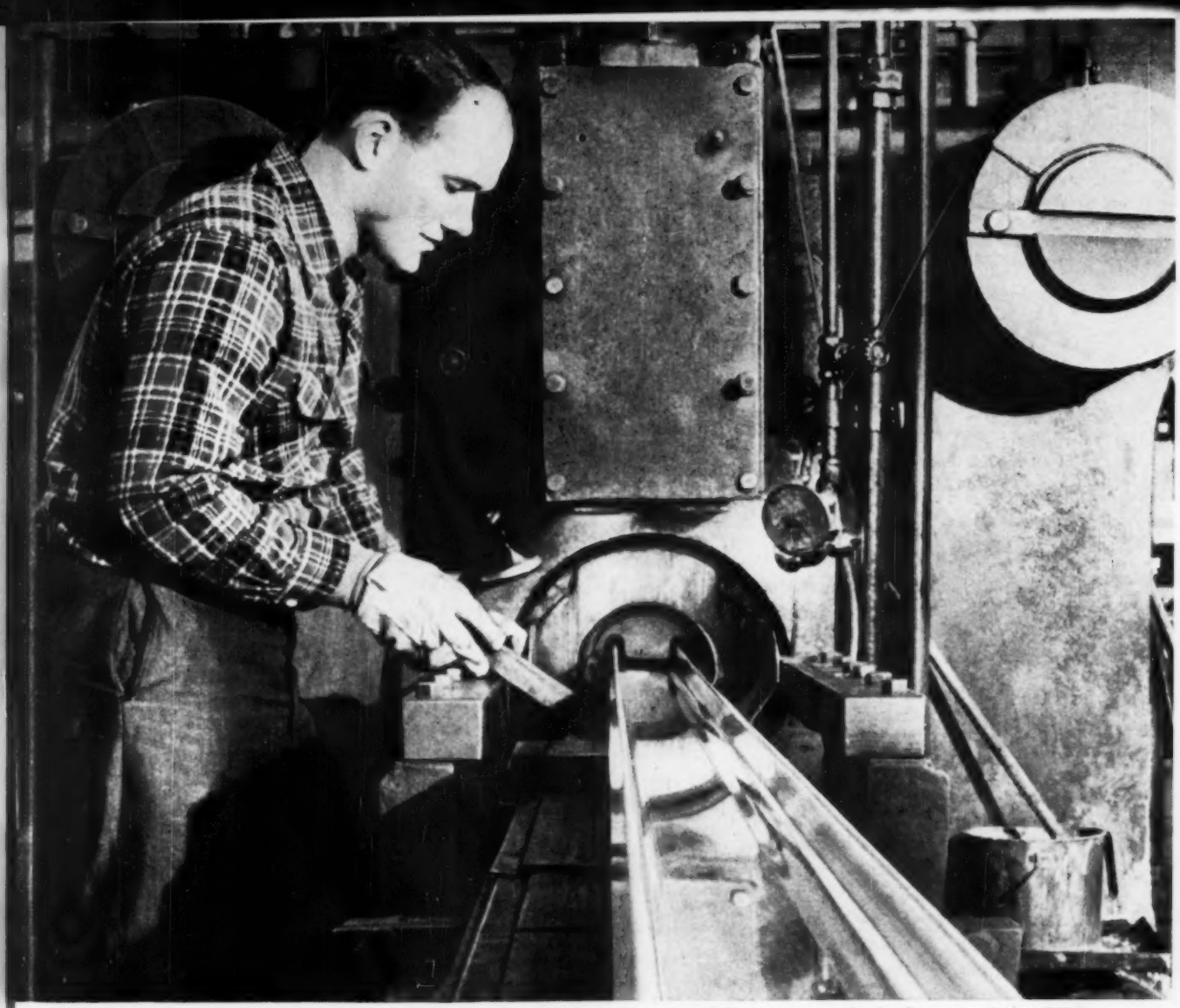
"I am convinced," he states, "that management to a great extent has overlooked the importance of proper training and supervision of weighing personnel. Weighing is one of the most important phases of merchandising. No one should be given this responsibility without proper training and supervision."

Seller's Loss—Contrary to popular belief it's the seller, not the buyer, who suffers most when scales are awry. A survey of leading weights and measures officials, reported by the Scale Manufacturers Assn., shows the greater number of scale errors are against the seller's interest. Typical is this comment from one official: "We found approximately 59 pct of the errors are against the scale owner, and only 41 pct against the customer."

Inaccurate weighing can be a costly waste. A mistake of only an ounce in material selling for $1 a pound, if repeated 100 times a day for 300 working days, costs the seller over $1800.

Buyer's Market—At the moment the scale market still belongs to the buyer. Builder backlogs are growing, but scale delivery schedules are still good. Most manufacturers don't expect any price increases in the foreseeable future.

Industrial scalemakers are encouraged about the outlook for their products. After sliding off during the recession sales rebounded in the last quarter of '58. For that period shipments were almost 20 pct above the first quarter of '58.



An improved version of the magnesium silicide alloys, new ALCAN B51S is substantially more economical to extrude than AA-6061.

From Aluminium research...

A new kind of extrusion alloy

New ALCAN B51S aluminum alloy... extrudes more economically than its alloy equivalents... offers important new market opportunities for your extruded products.

Newest of Aluminium Limited's research developments, ALCAN B51S offers many advantages to aluminum extruders now working with AA-6061 (ALCAN 65S).

The immediate advantages of this new alloy are realized in the shop—in economy of extrusion and in the quality of the as-extruded finish. For ALCAN B51S extrudes substantially faster than AA-6061 (ALCAN 65S) with less pick-up and fewer die lines. Both advantages are particularly evident in porthole extrusions.

To the independent fabricator, the new alloy also offers increased market opportunities. Its greater strength will be valuable in many areas of aluminum application: including railings, decking, lighting standards and brackets; electrical substations and structural members of road vehicles—each and every one a new mass-tonnage opportunity for the aluminum fabricator.

For technical information on new ALCAN B51S, or for specific assistance on any ingot problem, call or write the nearest office of Aluminium Limited Sales, Inc.

Aluminium Limited

Ingot Specialist...serving American Aluminum Fabricators—

In the U. S. — Aluminium Limited Sales, Inc.
630 Fifth Avenue, New York 20, N.Y.

Cleveland • Chicago • Los Angeles • Detroit • Atlanta

Additional distribution (Alcan Foundry Alloys):
Apex Smelting Co., Chicago, Cleveland, Los Angeles
Charles Batchelder Company, Inc., Botsford, Conn.

Seasonal Demands Add To Order Surge

Second quarter sales interest is swinging to tinplate, pipe, reinforcing bar, shapes, and wire products.

This seasonal buying by construction, farm, and canmaking interests comes with the market already tight.

▪ A new factor is tightening the already tight steel market.

It's the seasonal upsurge in steel demand for construction, farm, and canmaking uses. With sheet order books virtually closed for the first half, and plate and bar demand already strong, sales interest is shifting to other products.

More orders are now coming in for tinplate, standard pipe, reinforcing bar, structurals, and merchant wire products. These new orders arrive as the mills already are operating beyond 90 pct of capacity. And they come when deliveries are stretching out, mill backlogs are building, and a freight shortage is developing.

This year spring demand for steel will have an added bite. That's because these steel users will also be stocking up against an expected steel strike.

Some construction buyers, for example, are already placing advance orders for welded wire fabric and reinforcing bars. In the past some counted on using imports when domestic supplies were tight. This year they are not waiting until local sources dry up.

Merchant wire product sales are also being spurred on by two stimulants: (1) seasonal buying and (2) hedge buying. Structural fabricators are starting to build inventories. And tinplate mills are turning down orders every day.

So far, standard pipe sales have been lagging behind the rest of the market. But, here also, coming construction demands coupled with hedge buying, should bring a second quarter order squeeze.

Sheet and Strip—For all practical purposes sheet products are sold out for the first half. This includes hot-rolled, cold-rolled, galvanized, and electrical sheet. Some spot tonnages of hot-rolled are still available, but they are the exceptions. Many mills have opened third quarter order books well in advance of normal lead times.

Some steel service centers are worried about inadequate sheet stocks as consumer demand remains high. The distributors know in some cases their April orders will be reduced by quotas at the mill level.

Bar—Demand continues moving upward, both for hot-rolled and cold-finished bar. Steel service centers report orders are cutting deeply into their stocks of hot-rolled bar. Cold drawn bar sales are also more brisk at the warehouse level.

PURCHASING AGENT'S CHECKLIST

How fasteners meet the challenge of new demands. **P. 77**

Steel foundry order books fill up at the fastest rate since 1957. **P. 80**

Locomotive builders look forward to good sales years. **P. 84**

Pipe and Tubing—Producers of oil country seamless have reached or are nearing the cutoff point on first-half orders. The overflow of second-quarter orders has spread back into the first quarter. As a result both periods are sold out. There's little push yet on standard pipe orders. Some jobbers are doing a little more advance buying.

Stainless—Mills can still generally offer good delivery on all stainless products. However their backlogs are growing. There's a steady order increase for sheets, bars and plates. Automotive orders for stainless strip are still rising. Service centers have good stocks of stainless, but mill furnaces will probably operate at near-capacity levels through June.

Republic Steel Corp. has reduced prices on these Type 348 stainless steel products: cold-rolled sheet and strip, plate, bar, structurals, hot-rolled rods, cold finished wire, and forging billets. (Prices are now the same as those quoted for Type 347 on p. 168). Republic also made downward revisions in finishing and packing extras.

Railroad Products — Mills are about booked to capacity on railroad products through June. This includes wheels, axles, rails, and track materials. The railroads so far are building and repairing cars on a rush basis. Long-range carbuilding programs have not developed. But they are believed on the way.

Furnace Startups—Because of increased demand for steel Republic has re-opened its No. 1 blast furnace at Gadsden, Ala., idle for more than a year. The company is also stepping up ingot output of its electric and openhearth furnaces there.

At Cleveland, Jones & Laughlin has pressed two new electric furnaces into service to meet carbon steel demand. The furnaces which raised J&L's ingot capacity there by 400,000 tons, were installed in a $90 million revamping program completed last summer.

COMPARISON OF PRICES

(Effective March 17, 1959)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Mar. 17 1959	Mar. 10 1959	Feb. 17 1959	Mar. 18 1958
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	4.925¢
Cold-rolled sheets	6.275	6.275	6.275	6.05
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.60
Hot-rolled strip	5.10	5.10	5.10	4.925
Cold-rolled strip	7.425	7.425	7.425	7.17
Plate	5.30	5.30	5.30	5.12
Plates, wrought iron	13.55	13.55	13.55	13.15
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.30
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.00
Special coated mfg. ternes	9.90	9.90	9.90	9.55
Bars and Shapes: (per pound)				
Merchant bar	5.675¢	6.675¢	5.675¢	5.425¢
Cold finished bar	7.65	7.65	7.65	7.30
Alloy bars	6.725	6.725	6.725	6.475
Structural shapes	5.50	5.50	5.50	5.275
Stainless bars (No. 302)	46.75	46.75	45.00	45.00
Wrought iron bars	14.90	14.90	14.90	14.45
Wire: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	7.65¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.525
Light rails	6.725	6.725	6.725	6.50
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$77.50
Slabs, rerolling	80.00	80.00	80.00	77.50
Forging billets	99.50	99.50	99.50	96.00
Alloy blooms, billets, slabs	119.00	119.00	119.00	114.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.15¢
Skelp	5.05	5.95	5.05	4.875
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	5.967¢

	Mar. 17 1959	Mar. 10 1959	Feb. 17 1959	Mar. 18 1958
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.97
Foundry, Southern Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.47
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb‡	12.25	12.25	12.25	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.49
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$44.50	$44.50	$47.50	$36.50
No. 1 steel, Phila. area	37.50	37.50	39.50	38.00
No. 1 steel, Chicago	*40.50*	41.50	44.50	34.50
No. 1 bundles, Detroit	37.50	37.50	39.50	29.50
Low phos., Youngstown	*45.50*	47.50	49.50	38.50
No. 1 mach'y cast, Pittsburgh	51.50	51.50	51.50	51.50
No. 1 mach'y cast, Phila.	49.50	49.50	49.50**	49.50
No. 1 mach'y cast, Chicago	*55.50*	56.50	57.50	48.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	*$40.83*	$41.17	$43.83	$36.33
No. 2 bundles	*28.67*	29.00	30.33	27.17
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.50-15.50	$14.50-15.50	$14.50-15.50	$15.38
Foundry coke, prompt	18.50	18.50	18.50	17.50-19
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	31.50	30.00	30.00	25.00
Copper, Lake, Conn.	31.50	30.00	30.00	25.00
Tin, Straits, N. Y.	103.50†	102.75*	102.75	95.00
Zinc, East St. Louis	11.00	11.00	11.50	10.00
Lead, St. Louis	11.30	10.80	11.30	12.80
Aluminum, virgin ingot	26.80	26.80	26.80	28.10
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. * Revised. ** Corrected.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

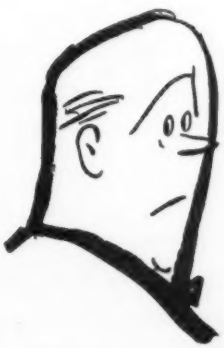
Steel Scrap Composites

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

INDEX TO PRICE PAGES

Prices At a Glance 151
Comparison of Prices 155
Bars 164
Billets, Blooms and Slabs 162
Boiler Tubes 166
Bolts, Nuts, Rivets, Screws 167
Clad Steel 166
Coke 166
Electrical Sheets 166
Electrodes 166
Electroplating Supplies 167
Ferroalloys 169
Iron Ore 167
Merchant Wire Products 166
Metal Powders 167
Nonferrous
- Mill Products 161
- Primary Prices 155-160-161
- Remelted Metals 161
- Scrap 161

Piling 162
Pig Iron 168
Pipe and Tubing 165
Plates 164
Rails 166
Refractories 166
Service Center Prices 167
Shapes 162
Sheets 163
Spring Steel 166
Stainless 168
Steel Scrap 158
Strip 162
Structurals 162
Tinplate 163
Tool Steel 166
Track Supplies 166
Water Pipe Index 167
Wire 164
Wire Rod 163



PUZZLED . . .

about personnel problems

Dissatisfied with present recruiting methods? The IRON AGE Employment Exchange is the meeting place for employers and men qualified in all phases of metalworking. For advertising rates, write to Chestnut and 56th Sts., Philadelphia 39.

Lull Settles Over Scrap Market

Prices are generally weaker as the mills continue to stay out of the market.

Dealer confidence is waning. There are increasing reports of "sacrifice" sales.

▪ Optimists are disappearing from the scrap market faster than the winter snow.

Spring is upon us and the summer lull is not far behind—steel strike or no steel strike. So far, the mills show little interest in buying large amounts of scrap. They are still getting most of the scrap they need from inventory and from industrial lists.

The trade is growing uneasier by the moment as it becomes increasingly possible that the mills may not enter the market at all before the July 1 strike deadline. Even if they do, there will probably have to be a general wave of mill buying to shake prices loose from present levels.

Each week that passes without any new tonnage orders means that much less chance for a rebound in the dealer market. As a result, dealer resistance is crumbling.

The only bright spot in the picture is the prospect of new export orders in the port districts. But even the export buyers appear to be holding up on their purchases, apparently waiting to see how low prices will go before they buy.

The Iron Age No. 1 Heavy Melting Composite Price this week dropped 34¢ to $40.83, the lowest since the second week of January. The drop is based on a $1 lower price in Chicago.

Pittsburgh — Prices of dealer openhearth grades are unchanged. The price of No. 1 railroad heavy melting dropped $1 on a late list. Mills continue to buy only for current needs. The limited tonnages involved are being supplied readily without price advances. Brokers say mill inventories are dropping rapidly. They are hopeful larger orders will come. But at the moment, sellers outnumber buyers and time is running out.

Chicago — Prices drifted downward on small mill purchases. Optimists who see a comeback in the market by the end of March are getting fewer. More dealers are allowing tonnages to move to brokers at reduced prices. Sacrifice sales of railroad grades, some steelmaking grades, and even foundry scrap confirm growing dealer uneasiness over the immediate outlook.

Philadelphia — There was little domestic business here in the past week. The market is soft and prices appear to be weakening, although no actual changes are reported. A small amount of export activity is going on.

New York—Chief activity here are new cast orders from pipe foundries at $1 to $2 higher than previous prices. Otherwise, the market is slow and little material is moving.

Detroit—The usual mid-month doldrums have set in and ample stocks of scrap at local mills are doing little to brighten the outlook for dealers. Machine shop turnings have eased about $1 while the continued shortage of clean automotive blocks has caused another $1 rise in the price for that grade.

Cleveland — Market weakened another $1 on broker offerings. Dealer inventories have accumulated to a point where a major purchase could be covered at present prices. It would take a wave of orders to raise them. Industrial tonnage continues to get preference, with dealers getting the leftovers.

St. Louis — Slow mill demand again depressed openhearth scrap prices in the district. Inventories are heavy, both at mill and dealer levels. Turnings are down 50¢ and railroad and cast grades down $1.

Birmingham — First-of-the-month purchases are being covered by brokers with little difficulty. There is some scattered new buying at existing prices but scrap is moving slowly.

Cincinnati—This market is busy covering healthy shipments on old orders. But no new business is in the wind.

Buffalo—A softening is apparent in the market. Rail items are down $2. Other prices are unchanged and no sales are reported.

Boston — There are no price changes. The market is quiet with little domestic or export activity to speak of.

West Coast—Prices are firm. A rash of export business tightened up the market. Some exporters are reported paying above quoted prices. Local mills are buying only minimum tonnage.

Houston—The district mill is out of the market for the rest of the month and anticipates no new purchases in March. However, its most recent purchases brought stability to the market. New export orders are expected soon.

Pick up 15 tons with one hand?

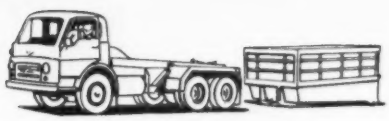
It's easy with

HUGE-HAUL

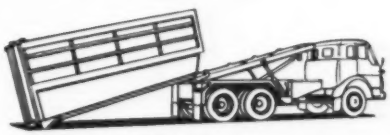
And profitable, too! The Huge-Haul system of big detachable bodies* handled by a truck equipped with a Huge-Haul hoist reduces your ton-mile costs to new lows. Unlike an ordinary truck, the Huge-Haul truck doesn't wait to be loaded. It leaves its Huge-Haul body at a scrap collection point to be picked up later after it has been filled. Meanwhile the truck is busy placing or picking up Huge-Haul bodies at other locations — with Huge-Haul a single truck becomes a fleet. You need fewer trucks and fewer drivers to collect bigger scrap tonnages from a wider area—and make bigger profits.

You will be interested in the many cost-cutting advantages which the Huge-Haul system offers you. Write or 'phone today for the complete story and the name of your nearest dealer.

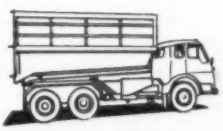
*Huge-Haul detachable bodies are available in capacities to 40 cubic yards. Huge-Haul's hydraulic hoist has a capacity of 30,000 pounds.



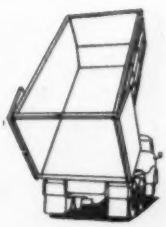
APPROACH



PICK UP



HAUL



DUMP

INGERSOLL KALAMAZOO B-W BORG-WARNER

Borg-Warner Corporation

INGERSOLL KALAMAZOO DIVISION

1833 North Pitcher Street, Kalamazoo, Michigan, Telephone Fireside 5-3501

EXPORT SALES: BORG-WARNER INTERNATIONAL CORPORATION, CHICAGO

SCRAP PRICES *(Effective March 17, 1959)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 dealer bundles	44.00 to 45.00
No. 1 factory bundles	50.00 to 51.00
No. 2 bundles	31.00 to 32.00
No. 1 busheling	44.00 to 45.00
Machine shop turn.	24.00 to 25.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Low phos. punch'gs plate	50.00 to 51.00
Heavy turnings	37.00 to 38.00
No. 1 RR hvy. melting	46.00 to 47.00
Scrap rails, random lgth.	55.00 to 56.00
Rails 2 ft and under	58.00 to 59.00
RR specialties	52.00 to 53.00
No. 1 machinery cast.	51.00 to 52.00
Cupola cast.	45.00 to 46.00
Heavy breakable cast.	43.00 to 44.00
Stainless	
18-8 bundles and solids	225.00 to 230.00
18-8 turnings	120.00 to 125.00
430 bundles and solids	125.00 to 130.00
410 turnings	50.00 to 60.00

Chicago

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 dealer bundles	41.00 to 42.00
No. 1 factory bundles	44.00 to 45.00
No. 2 bundles	29.00 to 30.00
No. 1 busheling	40.00 to 41.00
Machine shop turn.	20.00 to 21.00
Mixed bor. and turn.	22.00 to 23.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	22.00 to 23.00
Low phos. forge crops	51.00 to 52.00
Low phos. punch'gs plate, ¼ in. and heavier	48.00 to 49.00
Low phos, 2 ft and under	46.00 to 47.00
No. 1 RR hvy. melting	44.00 to 45.00
Scrap rails, random lgth.	50.00 to 51.00
Rerolling rails	62.00 to 63.00
Rails 2 ft and under	58.00 to 59.00
Angles and splice bars	53.00 to 54.00
RR steel car axles	70.00 to 71.00
RR couplers and knuckles	49.00 to 50.00
No. 1 machinery cast.	55.00 to 56.00
Cupola cast.	48.00 to 49.00
Cast iron wheels	42.00 to 43.00
Malleable	55.00 to 56.00
Stove plate	45.00 to 46.00
Steel car wheels	50.00 to 51.00
Stainless	
18-8 bundles and solids	215.00 to 220.00
18-8 turnings	115.00 to 120.00
430 bundles and solids	115.00 to 120.00
430 turnings	55.00 to 60.00

Philadelphia Area

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 dealer bundles	40.00 to 41.00
No. 2 bundles	24.00 to 26.00
No. 1 busheling	39.00 to 40.00
Machine shop turn.	21.00 to 22.00
Mixed bor. short turn.	22.00 to 23.00
Cast iron borings	22.00 to 23.00
Shoveling turnings	25.00 to 26.00
Clean cast. chem. borings	30.00 to 31.00
Low phos. 5 ft and under	43.00 to 44.00
Low phos. 2 ft punch'gs	44.00 to 45.00
Elec. furnace bundles	41.00 to 42.00
Heavy turnings	35.00 to 36.00
RR specialties	45.00 to 46.00
Rails 18 in. and under	59.00 to 60.00
Cupola cast.	40.00 to 41.00
Heavy breakable cast.	42.00 to 43.00
Cast iron car wheels	44.00 to 45.00
Malleable	67.00 to 68.00
No. 1 machinery cast.	49.00 to 50.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$37.50 to $38.50
No. 2 hvy. melting	32.50 to 33.50
No. 1 dealer bundles	37.50 to 38.50
No. 2 bundles	24.00 to 25.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	19.00 to 20.00
Low phos. 18 in. and under	46.00 to 47.00
Rails, random length	49.00 to 50.00
Rails, 18 in. and under	56.00 to 57.00
No. 1 cupola cast.	44.00 to 45.00
Hvy. breakable cast.	40.00 to 41.00
Drop broken cast.	48.00 to 49.00

Youngstown

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 dealer bundles	44.00 to 45.00
No. 2 bundles	29.00 to 30.00
Machine shop turn.	22.00 to 23.00
Shoveling turnings	22.00 to 23.00
Low phos. plate	45.00 to 46.00

Cleveland

No. 1 hvy. melting	$40.50 to $41.50
No. 2 hvy. melting	33.50 to 34.50
No. 1 dealer bundles	40.50 to 41.50
No. 1 factory bundles	45.00 to 46.00
No. 2 bundles	24.50 to 25.50
No. 1 busheling	40.50 to 41.50
Machine shop turn.	17.00 to 18.00
Mixed bor. and turn.	22.00 to 23.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	22.00 to 23.00
Cut structural & plates, 2 ft & under	46.00 to 47.00
Drop forge flashings	40.50 to 41.50
Low phos. punch'gs plate	41.50 to 42.50
Foundry steel, 2 ft & under	40.00 to 41.00
No. 1 RR hvy. melting	44.00 to 45.00
Rails 2 ft and under	58.00 to 59.00
Rails 18 in. and under	59.00 to 60.00
Steel axle turnings	26.00 to 27.00
Railroad cast.	53.00 to 54.00
No. 1 machinery cast.	51.00 to 52.00
Stove plate	48.00 to 49.00
Malleable	66.00 to 67.00
Stainless	
18-8 bundles	210.00 to 220.00
18-8 turnings	115.00 to 120.00
430 bundles	110.00 to 120.00

Buffalo

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 busheling	39.00 to 40.00
No. 1 dealer bundles	39.00 to 40.00
No. 2 bundles	28.00 to 29.00
Machine shop turn.	18.00 to 19.00
Mixed bor. and turn.	20.00 to 21.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	20.00 to 21.00
Low phos. plate	44.00 to 45.00
Structurals and plate 2 ft and under	48.00 to 49.00
Scrap rails, random lgth.	46.00 to 47.00
Rails 2 ft and under	56.00 to 57.00
No. 1 machinery cast.	51.00 to 52.00
No. 1 cupola cast.	47.00 to 48.00

St. Louis

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	39.00 to 40.00
No. 2 bundles	27.00 to 28.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	22.00 to 23.00
No. 1 RR hvy. melting	41.00 to 42.00
Rails, random lengths	47.00 to 48.00
Rails, 18 in. and under	52.00 to 53.00
Angles and splice bars	49.00 to 50.00
RR specialties	45.00 to 46.00
Cupola cast.	49.00 to 50.00
Heavy breakable cast.	40.00 to 41.00
Cast iron brake shoes	37.00 to 38.00
Stove plate	43.00 to 44.00
Cast iron car wheels	44.00 to 45.00
Rerolling rails	59.00 to 60.00
Unstripped motor blocks	41.00 to 42.00

Birmingham

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	33.00 to 34.00
Machine shop turn.	24.00 to 25.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	14.00 to 15.00
Electric furnace bundles	37.00 to 38.00
Elec. furnace, 3 ft & under	36.00 to 37.00
Bar crops and plate	42.00 to 43.00
Structural and plate, 2 ft.	41.00 to 42.00
No. 1 RR hvy. melting	37.00 to 38.00
Scrap rails, random lgth.	43.00 to 44.00
Rails, 18 in. and under	51.00 to 52.00
Angles and splice bars	44.00 to 45.00
Rerolling rails	55.00 to 56.00
No. 1 cupola cast.	53.00 to 54.00
Stove plate	53.00 to 54.00
Cast iron car wheels	41.00 to 42.00
Unstripped motor blocks	40.00 to 41.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	26.00 to 27.00
No. 2 dealer bundles	18.00 to 19.00
Machine shop turnings	12.00 to 13.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	16.00 to 17.00
Clean chem. cast. borings	23.00 to 25.00
No. 1 machinery cast.	37.00 to 38.00
Mixed yard cast.	35.00 to 36.00
Heavy breakable cast.	33.00 to 34.00
Stainless	
18-8 prepared solids	195.00 to 200.00
18-8 turnings	85.00 to 90.00
430 prepared solids	85.00 to 90.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	23.00 to 24.00
No. 1 busheling	35.00 to 36.00
Drop forge flashings	34.00 to 35.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	17.00 to 18.00
Heavy breakable cast.	35.00 to 36.00
Mixed cupola cast.	42.00 to 43.00
Automotive cast.	49.00 to 50.00
Stainless	
18-8 bundles and solids	210.00 to 215.00
18-8 turnings	100.00 to 105.00
430 bundles and solids	105.00 to 110.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	30.00 to 31.00
No. 2 bundles	17.00 to 18.00
No. 1 busheling	30.00 to 31.00
Machine shop turn.	10.00 to 11.00
Shoveling turnings	13.00 to 14.00
Clean cast. chem. borings	18.00 to 19.00
No. 1 machinery cast.	33.00 to 34.00
Mixed cupola cast.	33.00 to 34.00
Heavy breakable cast.	31.00 to 32.00
Stove plate	29.00 to 30.00

San Francisco

No. 1 hvy. melting	$36.00
No. 2 hvy. melting	34.00
No. 1 dealer bundles	$32.00 to 34.00
No. 2 bundles	22.00
Machine shop turn.	17.00
Cast iron borings	17.00
No. 1 cupola cast.	44.00 to 45.00

Los Angeles

No. 1 hvy. melting	$38.00
No. 2 hvy. melting	36.00
No. 1 dealer bundles	35.00
No. 2 bundles	21.00
Machine shop turn.	$16.00 to 17.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Elec. furn. 1 ft and under (foundry)	49.00
No. 1 cupola cast.	44.00 to 45.00

Seattle

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	33.00
No. 2 bundles	22.00
No. 1 cupola cast.	36.00
Mixed yard cast.	36.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$34.50
No. 2 hvy. melting	30.50
No. 1 dealer bundles	34.50
No. 2 bundles	25.00
Mixed steel scrap	26.50
Bush., new fact., prep'd	34.50
Bush., new fact., unprep'd	28.50
Machine shop turn.	13.00
Short steel turn.	17.00
Mixed bor. and turn.	13.00
Rails, rerolling	37.00
Cast scrap	$46.50 to 48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$38.00
No. 2 hvy. melting	35.00
No. 2 bundles	23.00
Machine shop turn.	16.00
Shoveling turnings	20.00
Cut structural plate 2 ft & under	$47.00 to 48.00
Unstripped motor blocks	38.00 to 39.00
Cupola cast.	44.50 to 45.00
Heavy breakable cast.	30.00 to 31.00

Leaders in Iron & Steel Scrap Since 1889
For over half a century our experience, personnel, equipment and key office locations have contributed to the steady growth of the iron and steel industry. Possibly our facilities may help you solve a problem in iron or steel scrap—no matter how big or small.
Luria Brothers and Company, Inc.
main office PHILADELPHIA NATIONAL BANK BUILDING, Phila. 7, Pa.
PLANTS
LEBANON, PENNA. DETROIT (ECORSE), MICHIGAN
READING, PENNA. PITTSBURGH, PENNA.
MODENA, PENNA. ERIE, PENNA.
OFFICES
BIRMINGHAM, ALA. CLEVELAND, OHIO LOS ANGELES, CAL. PUEBLO, COLORADO
BOSTON, MASS. DETROIT, MICHIGAN MEMPHIS, TENNESSEE READING, PENNA.
BUFFALO, NEW YORK HOUSTON, TEXAS NEW YORK, NEW YORK ST. LOUIS, MISSOURI
CHICAGO, ILLINOIS KOKOMO, INDIANA PHILADELPHIA, PENNA. SAN FRANCISCO, CAL.
CINCINNATI, OHIO LEBANON, PENNA. PITTSBURGH, PENNA. SEATTLE, WASHINGTON
In Canada MONTREAL, QUEBEC—HAMILTON, ONTARIO
IMPORT & EXPORT — LIVINGSTON & SOUTHARD, INC., 99 Park Avenue, New York, N. Y. • Cable Address: FORENTRACO

Why Aluminum Users Can Keep Cool

There's plenty of aluminum buying going on as production is at new high level.

But there appears to be little or no strike hedging, and here's why.

▪ The aluminum buyer, like his copper and steel brethren, is rebuilding his badly-depleted inventories. And he is driving production and sales of the producers to new heights in the process.

Like copper and steel, contracts between major producers and their unions expire this summer. But unlike steel or copper, there is no hint of panic in the current buying boom. Everyone is buying based on his production schedules, and no one seems seriously worried about the possibility of strikes that could hamper aluminum output. There are good reasons.

No Trail Blazers—The aluminum industry is a follower (by the calendar) of the steel industry in labor contract negotiations. It deals with two major unions: Aluminum Workers of America, and the United Steelworkers. Its pacts expire July 31, a month after the steel industry's. Usually, aluminum settles for the same as steel on the basic issues. And without a strike.

But this year there is more than just a reasonable expectation to keep aluminum buyers at ease.

A major factor is that although aluminum production is at a record high, the industry is only operating at 80 to 85 pct of capacity. Consumers are confident that no matter how heavy buying gets there'll be plenty to go around, at least for another few months.

Price is Firm—And they have no worry about a higher price, as in copper. Producers' guarantee they won't raise prices during the first half of the year has made the market just about immune from price hedging. This is especially so since some mill prices of such products as conduit and some types of wire, rod and bar have been lowered in 1959 when competition dictated.

Right now, buyers feel they have nothing to gain buying what they don't immediately need, and might save a few bucks if they wait.

Copper

Consensus is if you can get any copper for less than 34¢ per lb, grab it. While producers are still selling metal at 31½¢ per lb, they are rapidly filling their order books. They won't book more than one month ahead, and there isn't much April left.

Custom smelters are all but off the market. Officially, they are quoting a price of 34¢ per lb, but it's like pulling teeth to get some smelters to sell you any.

It looks like everyone from scrap dealers right along the line has pretty well made up his mind the copper price is headed higher, and is holding back for the higher return.

At this rate producers won't hold at 31½¢ per lb for very long.

Annual Reports

The more nonferrous reports that roll in, the more it becomes clear that 1958 was a terrible year.

Almost without exception sales and net income were off.

Alcoa—There's a new section in the Alcoa annual report this year —foreign operations. Says the company, "In 1958 Alcoa broadened the scope of its foreign activities and made a number of organization changes designed to take advantage of the promising opportunities offered by foreign markets."

Here's the financial picture:

	1958	1957
Gross Revenue	$758.1	$875.5
Net Income	42.9	75.6
Capital Spending	81.6	207.5

(millions of dollars)

International Nickel—Lower demand for nickel, lower prices and deliveries of platinum, lower copper prices, and a crippling strike combined to make Inco's 1958 earnings look enemic next to 1957.

	1958	1957
Net Sales	$322.0	$442.9
Net Earnings	39.7	86.1

(Millions of dollars)

Tin prices for the week: March 11—103.375; March 12—103.375; March 13—103.25; March 16—103.50; March 17—103.50.*

*Estimate.

Primary Prices

cents per lb)	current price	last price	date of change
Aluminum pig	24.70	24.00	8/1/58
Aluminum ingot	26.80	26.10	8/1/58
Copper (E)	31.50	30.00	3/9/59
Copper (CS)	34.00	32.00	3/16/59
Copper (L)	31.50	30.00	3/9/59
Lead, St. L.	11.30	10.80	3/5/59
Lead, N. Y.	11.50	11.00	3/5/59
Magnesium ingot	36.00	34.00	8/13/58
Magnesium pig	35.25	33.75	8/13/58
Nickel	74.00	64.50	12/8/58
Titanium sponge	162-182	185-205	11/3/58
Zinc, E. St. L.	11.00	11.50	2/25/59
Zinc, N. Y.	11.50	12.00	2/25/59

ALUMINUM: 99% ingot frt allwd. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colbourne, Canada. ZINC: prime western. Tin: See above; Other primary prices, pg. 161.

NONFERROUS PRICES

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship pt., frt. allowed)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.032	.081	.136-.249	.250-3.
1100, 3003	45.7	43.8	42.8	43.3
5052	53.1	48.4	46.9	46.0
6061-0	50.1	45.7	43.9	44.9

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6-8	42.7-44.2	51.1-54.8
12-14	42.7-44.2	52.0-56.5
24-26	43.2-44.7	62.8-67.5
36-38	46.7-49.2	86.9-90.5

Screw Machine Stock—2011-T-3

Size"	¼	⅜-⅝	⅞-1	1¼-1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

Sheet and Plate

Type→ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	108.1
AZ31B Spec.	.....	93.3	95.7	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	69.6	70.7	75.6	89.2
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	126	106	128
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	120	105	121
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	55.63	.....	52.86	55.82
Brass, Yellow	48.24	48.75	48.18	51.65
Brass, Low	51.23	51.77	51.17	54.54
Brass, R L	52.29	52.83	52.23	55.60
Brass, Naval	52.80	.....	46.61	56.21
Muntz Metal	50.85	.....	46.16	.....
Comm. Bz.	53.90	54.44	53.84	56.96
Mang. Bz	56.54	.....	50.14	.....
Phos. Bz. 5%	75.34	.....	75.84	.....

Free Cutting Brass Rod 32.73

TITANIUM

(Base prices, f.o.b. mill)

Sheet and strip, commercially pure, $6.90-$7.40; alloy, $14.35. Plate, HR, commercially pure, $5.00-$5.75; alloy, $7.75-$8.50. Wire, rolled and/or drawn, commercially pure, $5.50-$6.00; alloy, $8.00-$9.50; Bar, HR or forged, commercially pure, $4.25-$4.65; alloy, $4.25-$7.15; billets, HR, commercially pure, $3.55-$4.10; alloy, $3.55-$5.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium aluminum 5% Be, Dollar per lb contained Be $74.75
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.45
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic basis... $ 1.31
Cobalt, 97-99% (per lb) .... $1.75 to $1.82
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 35.00 to 42.00
Gold, U. S. Treas., per troy oz.... $35.00
Indium, 99.9%, dollars per troy oz.. $ 2.25
Iridium, dollars per troy oz.... $75 to $85
Lithium, 98% ..... $11.00 to $14.00
Magnesium, sticks, 100 to 500 lb.... 59.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $221 to $224
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz... $16 to $18
Platinum, dollars per troy oz... $77 to $80
Rhodium ..... $120.00 to $125.00
Silver ingots (¢ per troy oz.) 91.375
Thorium, per kg. $43.00
Vanadium ..... $ 3.45
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 30.75
- No. 120 ..... 29.75
- No. 123 ..... 28.75

80-10-10 ingot
- No. 305 ..... 35.00
- No. 315 ..... 33.00

88-10-2 ingot
- No. 210 ..... 43.50
- No. 215 ..... 39.25
- No. 245 ..... 35.00

Yellow ingot
- No. 405 ..... 25.00

Manganese bronze
- No. 421 ..... 28.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 24.75-25.00
- 0.60 copper max. 24.50-24.75

Piston alloys (No. 122 type).. 24.25-25.25
No. 12 alum. (No. 2 grade)... 21.50-22.00
108 alloy 22.00-22.50
195 alloy 25.00-26.00
13 alloy (0.60 copper max.)... 24.25-24.75
AXS-679 (1 pct zinc) 21.75-22.25

(Effective March 16, 1959)

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½% 22.50-23.50
Grade 2—92-95% 21.25-22.25
Grade 3—90-92% 20.25-21.25
Grade 4—85-90% 17.50-18.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	27½	26¾
Yellow brass	20⅝	18¾
Red brass	24¼	23½
Comm. bronze	25⅛	24⅜
Mang. bronze	19⅛	18⅜
Free cutting rod ends.	20½	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	30
No. 2 copper wire	28½
Light copper	26¼
*Refinery brass	28
Copper bearing material	27

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	30
No. 2 copper wire	28½
Light copper	26¼
No. 1 composition	23
No. 1 comp turnings	22½
Hvy. yellow brass solids	16½
Brass pipe	17¾
Radiators	18

Aluminum

Mixed old cast.	12	—13
Mixed new clips	15	—16
Mixed turnings, dry	13	—14

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire	26½—27
No. 2 copper wire	24½—25
Light copper	22½—23
Auto radiators (unsweated)	15¾—16¼
No. 1 composition	20 —20½
No. 1 composition turnings	19 —19½
Cocks and faucets	16¼—16¾
Clean heavy yellow brass	14½—15
Brass pipe	16¼—16¾
New soft brass clippings	17 —17½
No. 1 brass rod turnings	14¼—14¾

Aluminum

Alum. pistons and struts	6 — 6½
Aluminum crankcases	9½—10
1100 (2s) aluminum clippings	13 —13½
Old sheet and utensils	9½—10
Borings and turnings	6 — 6½
Industrial castings	9½—10
2020 (24S) clippings	11 —11½

Zinc

New zinc clippings	4¾— 5¼
Old zinc	3¼— 3½
Zinc routings	2 — 2¼
Old die cast scrap	1¾— 2

Nickel and Monel

Pure nickel clippings	52-54
Clean nickel turnings	37-40
Nickel anodes	52-54
Nickel rod ends	52-54
New Monel clippings	30-32
Clean Monel turnings	30-32
Old sheet Monel	26-28
Nickel Silver clippings, mixed	18
Nickel silver turnings, mixed	15

Lead

Soft scrap lead	6½— 6¾
Battery plates (dry)	2 — 2¼
Batteries, acid free	1¾— 2

Miscellaneous

Block tin	77 —78
No. 1 pewter	59 —60
Auto babbitt	40 —41
Mixer common babbitt	9½—10
Solder joints	13¼—13¾
Siphon tops	42
Small foundry type	9½—10
Monotype	9½—10
Lino. and stereotype	8½— 9
Electrotype	7 — 7½
Hand picked type shells	5¼— 5¾
Lino. and stereo. dross	2½— 2¾
Electro dross	2¼— 2¾

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3, R3*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Bridgeport, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3,* $114.00 *T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1,* *C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *F3*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$113.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

(Effective March 16, 1959)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Holloware Enameling *29* ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*			7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A1*	6.275 *A1*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*	6.875 *G2*							$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1**, *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *W5, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.95 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

*Electrogalvanized sheets.

(Effective March 16, 1959)

*7.425 at Sharon-Niles is 7.225

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.475 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt,, Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7,A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3* 6.475 *T5*	9.025 *R3,R2* 8.775 *T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5* 9.225 *B5,P3, P8*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*					5.30 *N4*				8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R5,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, S12*	8.625 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				8.675 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6*	6.425 *B2*				8.675 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.675 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective March 16, 1959) * Special Quality.

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B. Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owensboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mas.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*7.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

* Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.00¢ per lb.

(Effective March 16, 1959)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, C4, A3, J2*) 10 pct	Plate (*L4, C4, A3, J2*) 15 pct	Plate (*L4, C4, A3, J2*) 20 pct	Sheet (*I2*) 20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	28.80	31.55	34.30	40.00
	316	42.20	46.25	50.25	58.75
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 42.50; 1 side, 35.85.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25	.....	.....	.....
Cleveland *R3*	.....	.....	.....	.....	.....	15.35
So. Chicago *R3*	.....	.....	.....	10.10	.....	.....
Ensley *T2*	5.75	6.725	.....	.....	.....	.....
Fairfield *T2*	.....	6.725	.....	10.10	6.875	.....
Gary *U1*	5.75	.....	.....	.....	6.875	.....
Ind. Harbor *I3*	.....	.....	.....	10.10	.....	.....
Johnstown *B3*	.....	6.725	.....	.....	.....	.....
Joliet *U1*	.....	.....	7.25	.....	.....	.....
Kansas City *S2*	.....	.....	.....	10.10	.....	15.35
Lackawanna *B3*	5.75	6.725	7.25	.....	6.875	.....
Lebanon *B3*	.....	.....	7.25	.....	.....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *P5*	.....	.....	.....	.....	.....	14.75
Pittsburgh *J3*	.....	.....	.....	10.10	.....	.....
Seattle *B2*	.....	.....	.....	.....	6.75	15.85
Steelton *B3*	5.75	.....	7.25	.....	6.875	.....
Struthers *Y1*	.....	.....	.....	10.10	.....	.....
Torrance *C7*	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.725	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	10.10	.....	.....

COKE

	Net-Ton
Furnace, beehive (f.o.b.) Connellsville, Pa.	$14.50 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Detroit f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearney, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	34.35
Erie, Pa., f.o.b.	32.00
Cleveland, del'd	34.19
Cincinnati, del'd	32.84
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1959 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	....	9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	.....	12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30	Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	GRAPHITE Length (In.)	GRAPHITE Price	CARBON* Diam. (In.)	CARBON* Length (In.)	CARBON* Price
24	84	27.25	40	100,110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

Super duty, Mo., Pa., Md., Ky.	$185.00
High duty (except Salina, Pa., add $5.00)	140.00
Medium duty	125.00
Low duty (except Salina, Pa., add $2.00)	103.00
Ground fire clay, net ton, bulk	22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$158.00
Childs, Hays, Latrobe, Pa.	163.00
Chicago District	168.00
Western Utah	183.00
California	165.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	163.00-168.00
Silica cement, net ton, bulk, Latrobe	29.75
Silica cement, net ton, bulk, Chicago	26.75
Silica cement, net ton, bulk, Ensley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union	25.75
Silica cement, net ton, bulk, Utah and Calif.	39.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$109.00
Standard chemically bonded, Curtiner, Calif.	119.00
Burned, Balt.	103.00

Magnesite Brick

Standard, Baltimore	$140.00
Chemically bonded, Baltimore	119.00

Grain Magnesite

St. ⅜ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$16.75
Missouri Valley	15.60
Midwest	17.00

(Effective March 16, 1959)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3***	173	190	...	...	190	9.00	9.675
Atlanta *A8***	175	192	...	214	198	8.75	9.425
Bartonville *K2***	175	192	178	214	198	9.10	9.775
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4***	177	190	172	212	196	9.00	9.70
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dav. *M4***	175	192	...	214	198	9.10	9.775
Donora, Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	...	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9*	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**.	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Monessen *P6*	.....	.....	.....	.....	193	8.65	9.325
Palmer, Mass. *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	...	...	213	9.60	10.15
Rankin, Pa. *A5*	173	187	...	...	193	9.00	9.55
So. Chicago *R3*	173	187	...	...	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50†
SparrowsPt. *B3***	175	.....	...	214	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 11-12¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	8.95	10.40	12.60	15.60	18.55
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*	.....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	.....	.....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *R3*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Wallingford *W1*	9.40	10.70	12.90	15.90	18.55
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-in.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox	2	13	40.28	47.21	35.22
	2½	12	54.23	63.57	47.43
	3	12	62.62	73.40	54.77
	3½	11	73.11	85.70	63.93
	4	10	97.08	113.80	85.53
National Tube	2	13	40.28	47.21	35.22
	2½	12	54.23	63.57	47.43
	3	12	62.62	73.40	54.77
	3½	11	73.11	85.70	63.93
	4	10	97.08	113.80	85.53
Pittsburgh Steel	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

METAL POWDERS

Cents per lb, minimum truckload, delivered E. of Miss. River, unless otherwise noted.

Iron Powders

Compacting Powders

Electrolytic, imported, f.o.b.	29.50 to 33.00
Electrolytic, domestic	34.50
Sponge	11.25
Atomized	11.25
Hydrogen Reduced	11.25 to 12.00
Carbonyl	88.00
Welding Powders*	8.10
Cutting and Scarfing Powders*	9.10

Copper Powders

Electrolytic, domestic	41.00
Precipitated	40.50 to 45.00
Atomized	39.80 to 48.30
Hydrogen reduced, f.o.b.	43.25
Bronze	47.20 to 51.50
Chromium, electrolytic	$5.00
Lead	19.00
Manganese, f.o.b.	42.00
Molybdenum	$3.60 to $3.95
Nickel	$1.05 to $1.03
Nickel Silver	53.50
Nickel Steel	13.00
Solder	13¢ plus metal value
Stainless Steel, 302	$1.07
Stainless Steel, 316	$1.26
Steel, atomized, prealloyed, 4600 series	14.00 plus metal value
Tin	14¢ plus metal value
Titanium, 99.25+%, per lb., f.o.b.	$11.25
Tungsten	$3.15 (nominal)

* F.O.B., shipping point.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct. Discounts

Bolts	1-4 Containers	5 Containers	20,000 Lb.	40,000 Lb.
Machine ½" and smaller x 3" and shorter	55	57	61	62
⅝" diam. x 3" and shorter	47	49½	54	55
¾" thru 1" diam x 6" and shorter	37	39½	45	46
¾" thru 1" diam. longer than 6" and 1⅛" and larger x all lengths	31	34	40	41
Rolled thread, ½" and smaller x 3" and shorter	55	57	61	62
Carriage, lag, plow, tap, blank, step, elevator and fitting up bolts ½" and smaller x 6" and shorter	48	50½	55	56

Note: Add 25 pct for less than container quantity. Distributor prices are 5 pct less on bolts and square nuts.

Nuts, Hex, HP reg. & hvy.

	Full case or Keg price
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½

C. P. Hex, reg. & hvy.

¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½

Hot Galv. Hex Nuts (All Types)

¾ in. and smaller	41

Semi-finished Hex Nuts

¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½

(Add 25 pct for broken case or keg quantities)

Finished

⅞ in. and smaller	65

Rivets

Base per 100 lb

½ in. and larger	$12.85
	Pct. Off List
7/16 in. and smaller	15

Cap Screws

Discount (Packages)

Full Finished H. C. Heat Treat

New std. hex head, packaged	Full Case
⅝" diam. and smaller x 6" and shorter	54
¾", ⅞", and 1" diam. x 6" and shorter	38
⅝" diam. and smaller x longer than 6"	..
¾", ⅞", and 1" diam. x longer than 6"	..

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	59	48
¾" through 1" dia. x 6" and shorter	45	32

Minimum quantity—¼" through ⅜" diam., 15,000 pieces; 7/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

Plain Finish	Discount Mach. Screws	Stove Bolts
Cartons	60	60
Bulk		
Quantity		
To ¼" diam. incl. 25,000-and over	60	..
5/16 to ½" diam. incl. 15,000-200,000	60	..

Machine Screws & Stove Bolt Nuts

	Discount Hex	Square
In Cartons	16	19
Quantity		
In Bulk ⅜" diam. & smaller 25,000-and over	15	16

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	44.50
Electrodeposited	37.50
Brass, 80-20, ball anodes, 2000 lb or more	47.50
Zinc, ball anodes, 2000 lb lots (for elliptical add 1¢ per lb)	18.00
Nickel, 99 pct plus, rolled carton, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium	1.45
Tin, ball anodes $1.05 per lb (approx.).	

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	65.90
Copper sulphate, 100 lb bags, per cwt.	22.75
Nickel salts, single, 100 lb bags	36.00
Nickel chloride, freight allowed, 100 lb	45.00
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	23.70
(Philadelphia price 24.00)	
Zinc cyanide, 100 lb	60.75
Potassium cyanide, 100 lb drum N. Y.	45.50
Chromic acid, flake type, 10,000 lb or more	30.44

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	140.9
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

STEEL SERVICE CENTERS

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (18 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.59	9.87	10.13	8.91	9.29	9.40	9.39	13.24*	.....	.....	.....	.....
Baltimore	$.10	8.65	9.35	9.09	9.15	9.10	9.65	9.55	11.80*	16.28	15.28	19.82	19.08
Birmingham		8.18	9.45	10.46	8.51	8.89	9.00	8.99	.....	.....	.....	.....	.....
Boston	.10	9.41	10.50	12.07	9.84	10.12	10.11	10.21	13.45*	16.79	15.79	20.29	19.56
Buffalo	.15	8.40	9.75	11.00	8.90	9.35	9.40	9.30	11.60*	16.34	15.55	19.01	19.30
Chicago	.15	8.40	9.60	11.05	8.66	9.04	9.15	9.14	9.30	16.20	15.20	19.70	18.95
Cincinnati	.15	8.58	9.65	10.70	8.98	9.42	9.71	9.46	11.68*	16.52	15.52	20.02	19.27
Cleveland	.15	8.51	9.69	11.51	8.78	9.28	9.54	9.25	11.40*	16.31	15.31	19.81	19.06
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19	.....	.....	.....	20.84
Detroit	.15	8.66	9.85	11.40	9.03	9.41	9.71	9.45	9.66	15.46	15.48	18.81	19.23
Houston		8.10	8.60	.....	8.15	8.45	8.05	8.10	11.60	16.20	15.25	19.65	18.95
Kansas City	.15	9.02	10.27	11.37	9.33	9.71	9.82	9.81	10.22	16.87	15.87	20.37	19.62
Los Angeles		8.70[5]	11.20-11.80	12.20	9.15	9.10	9.00	9.10	12.95	17.30	16.35	21.30	20.60
Memphis	.15	8.55	9.80	.....	8.60	8.93	9.01	8.97	12.11*	.....	.....	.....	.....
Milwaukee	.15	8.54	9.73	11.19	8.80	9.18	9.37	9.28	9.54	16.34	15.34	19.84	19.09
New York	.10	9.27	10.59	11.20	9.74	9.87	9.84	10.09	13.35*	16.16	15.60	20.10	19.35
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	8.30	9.35	10.44	9.35	9.25	9.20	9.50	12.05*	16.58	15.58	20.08	19.33
Pittsburgh	.15	8.50-8.60	9.70-9.95	11.05	8.76	9.05	9.15	9.14	11.40*	16.20	15.20	19.70	18.95
Portland		10.00[1]	11.75[2]	13.30[3]	11.95[4]	11.50[5]	11.10[6]	9.85[7]	15.30*	18.50	17.45	20.75	20.25
San Francisco	.10	9.75	11.20	11.50	9.85	10.10	9.95	10.25	13.70	17.05	16.35	21.05	20.60
Seattle		9.95	11.55	12.45	10.00	9.70	9.80	10.10	14.70	17.15	16.80	20.65	20.60
Spokane	.15	10.10	11.70	12.60	10.65	9.85	9.95	10.75	14.85	17.75	16.95	21.55	20.75
St. Louis	.15	8.78	9.98	11.43	9.04	9.42	9.63	9.52	9.93	16.58	15.58	20.08	19.33
St. Paul	.15	8.94	10.19	11.64	8.99	9.45	9.53	9.70[7]	10.16	.....	15.41	.....	19.21

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. **All sizes except 18 and 16 gage.

†† 10¢ zinc. ‡ Deduct for country delivery. * C1018—1 in. rounds. [1] 10 ga. x 36" x 120"; [2] 20 ga. x 36" x 120"; [3] 26 ga. x 30" x 96"; [4] 4½" x 1" in lots of 1000 to 9999; [5] sheared plate ¼" x 84" in lots of 1000 to 9999; [6] 3" x 5.70" in lots of 1000 to 9999; [7] M-1020—1-in. rounds in lots of 1000 to 9999; [8] 15 ga. & heavier.

(Effective March 16, 1959)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.60	68.50	69.00	69.50	.....
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	.....
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	66.50	67.00	67.50	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W6*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	.....
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4* (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $103.50; (15.51-16.00), $106.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.25 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.): $64.00. Add $1.00 premium for all grades silvery to 18 pct.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25-31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6;* Gary, *U1,* (25¢ per lb. higher).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8.*

(Effective March 16, 1959)

Memo to the Metals Industry
Need any of these?

Vacuum Melting
* *Crucibles*
* *Furnaces*
* *Water Cooled Copper Stools*

Ingot Molds
* *Water Jacketed*
* *Fabricated Steel*
* *Graphite*

Check with us before you order. We'll quote!

ENGINEERING MANUFACTURERS FOR INDUSTRY
ZAK MACHINE WORKS INC.
TROY (GREEN ISLAND) N. Y.

ZINC
STRIP AND WIRE
•
ZINC METALIZING WIRE
•
ZINC ACCURATELY ROLLED
for electric fuse elements
THE PLATT BROS. & CO., WATERBURY 20, CONNECTICUT

GOSS and DE LEEUW
MULTIPLE SPINDLE
CHUCKING MACHINES
Four, Five, Six, Eight Spindles • Work and Tool Rotating Type
GOSS & DE LEEUW MACHINE CO., KENSINGTON, CONN.

KARDONG FOUR-WAY BENDER
For Concrete Reinforcing Steel
Model D-2

The Model D-2 Kardong Bender is a Four Direction Horizontal Bender. With this bender it is not necessary to turn bars over to make reverse or second bends on beam bars. The Model D-2 is made in two sizes. Model D-2 Standard 6-inch, which will bend bars around collars 2-inch to 6-inch and Model D-2 Special 8-inch, which will bend bars around collars 2-inch to 8-inch. Capacity of both models, 1¼-inch Square Bars. The Model D-2 is a production bender for reinforcing steel fabricating shop. Ask for catalog of our complete line of reinforcing bar benders.

KARDONG BROTHERS, INC.
MINNEAPOLIS 13, MINN.

FERROALLOY PRICES

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	38.00
0.05% C....	39.00	1.00% C....	37.75
0.10% C....	38.50	1.50% C....	37.50
0.20% C....	38.25	2.00% C....	37.25

4.00-4.50% C, 60-70% Cr, 1-2% Si.. 28.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 28.25
0.025% C (Simplex) 36.75
8% max C, 50-55% Cr, 6% max Si. 25.75
4½% max C, 50-55% Cr, 2% max Si 26.50

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97.25% min. Cr, 1% max. Fe.

0.10% max. C	$1.29
9 to 11% C, 88-91% Cr, 0.75% Fe...	1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.15
Ton lots	1.17
Less ton lots	1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	28.25	14.60
Ton lots	33.50	16.05
Less ton lots	35.10	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads, bulk	24.00
Ton lots	27.95
Less ton lots	29.45

Calcium-Manganese—Silicon

Cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads, bulk	23.00
Ton lots	26.15
Less ton lots	27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	21.15
Less ton lots	22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	18.45
Ton lots	19.95
Less ton lots	21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	19.20
Ton lots to carload packed	21.15
Less ton lots	22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	12.25
Johnstown, Pa.	12.25
Neville Island, Pa.	12.25
Sheridan, Pa.	12.25
Philo, Ohio	12.25
S. Duquesne	12.25

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	14.80
Ton lots packed in bags	17.20

Spiegeleisen

Per gross ton, lump, f.o.b. Palmerton, Pa., and Neville Island, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$100.50
19 to 21%	3% max.	102.50
21 to 23%	3% max.	105.00

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	34.00
Ton lots	36.00
250 to 1999 lb	38.00
Premium for Hydrogen - removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 25.50

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% (Bulk) P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	33.60	36.40	37.60
0.30% max. C	32.10	34.90	36.10
0.50% max. C	31.60	34.40	35.60
0.75% max. C, 80.85% Mn, 5.0-7.0% Si ...	28.60	31.40	32.60

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C. for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carloads bulk	12.80
Ton lots, packed	14.45
Carloads, bulk, delivered, per lb of briquet	15.10
Briquets, packed pallets, 3000 lb up to carloads	16.30

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe..	24.95	23.65
98% Si, 1.0% Fe	24.45	23.15

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk	8.00
Ton lots, packed	10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.60	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
	90% Si....	20.00	

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.

Openhearth	3.20
Crucible	3.30
High speed steel	3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb..	2.40	3.30	4.55

(Effective March 16, 1959)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads, bulk	9.85¢
Ton lots	11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.50

Ferrocolumbium, 50-60% lb, 2 in. x D, delivered per pound contained Cb.

Ton lots	$3.90
Less ton lots.....	3.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.76

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $240.00

Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered ..... $2.15 (nominal)

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. $1.49
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanni, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium silicon, per lb of alloy 35-40% del'd, carloads, bulk.. 26.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Bortram, f.o.b. Niagara Falls.

Ton lots per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 14.00¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots... $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19%	1.20
19% min. B	1.50

Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb and over

No. 1	$1.05
No. 79	50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots (packed)	$1.46
Less ton lots (packed)	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

RAILWAY EQUIPMENT
FOR SALE
Used As-Is Reconditioned
RAILWAY CARS
All Types
SERVICE-TESTED
FREIGHT CAR REPAIR PARTS
For All Types of Cars
LOCOMOTIVES
Diesel, Steam, Gasoline
Diesel-Electric

SPECIAL OFFERING
1—30-Ton American Diesel Locomotive Crane
Complete with Generator
New 1948

STANDARD GAUGE CARS
10 Covered Hopper Cars
70-Ton Capacity
Ore Hopper Cars
660 Cubic Feet
40- and 50-Ton Capacity
RAILWAY TANK CARS and STORAGE TANKS
6,000- 8,000- and 10,000-Gallon
Cleaned and Tested
IRON & STEEL PRODUCTS, INC.
General Office
13496 S. Brainard Ave.
Chicago 33, Illinois
Phone: Mitchell 6-1212
New York Office
Suite 1608-9, 51-B East 42nd St.
New York 17, N. Y.
Phone: YUkon 6-4766
"ANYTHING containing IRON or STEEL"

REBUILT—GUARANTEED ELECTRICAL EQUIPMENT

STEEL MILL SPECIALS

(1) 2200-HP. Westinghouse Motor, 600 V.D.C., 300/600 R.P.M.
(1) 1250-HP., Allis-Chalmers Motor, 600 V.D.C., 300/600 R.P.M.
(1) S.S. 4-unit M.G. Set consists of 2500-H.P., 8 P.F. Syn. motor, 11000/4160-V., 3 ph., 60 cy. (1) 1060-K.W. Gen. 600-V.D.C. and (2) 760-K.W. 600-V.D.C. Generators, complete with exciter sets.
(2) S.S. 645-H.P. Mill Motors, each 300-V.D.C. 1000 R.P.M. (used with above 1060-K.W. Gen.)
(2) S.S. Reel Motors (mill type) each 940-H.P. 800/1000 R.P.M., 600-V.D.C. (used with above (2) 760-K.W. Gen.). We will sell the above complete PACKAGE or segregate it to suit your REQUIREMENTS with necessary CONTROLS.

Special, before removal (1) 1875-K.W. Whse., M.G. Set, Gen. 250-V.D.C., 514 R.P.M. with 2700-H.P. Syn. Motor, 13800/6900/4000-V., 3 ph., 60 cy. with Control.

T. B. MAC CABE COMPANY
4302 Clarissa St., Philadelphia 40, Penna.
Cable Address "Macsteel" Philadelphia, Pa.
Phone Davenport 4-8300

Crane Rebuilding Gets Sales Lift

▪ Crane rebuilders say inquiries are improving as expansion and modernization programs, shelved a year ago, are dusted off and approved.

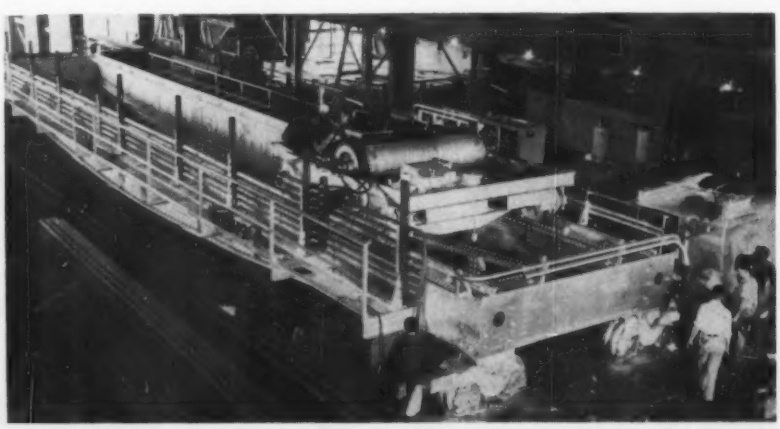
"We're now answering well over 100 inquiries each month," says Arnold Hughes, of Arnold Hughes Co. "And many of the inquiries are asking about more than one crane."

Supply Problems—Mr. Hughes, who says he has sold upwards of 500 rebuilt cranes since he started to specialize in this field 10 years ago, claims to be the world's largest buyer and seller of used cranes.

Currently the firm has over 500 cranes of all types and sizes listed for sale. Even so, he says, the major problem facing crane rebuilders today is finding enough good used cranes to buy outright for rebuilding. While the firm has earned a reputation for supplying steel mill cranes, bucket cranes, and all types of large bridge cranes, some 90 pct of present inquiries are for smaller 5 to 20 ton cranes.

Tailored to Needs — Hughes doesn't do its own rebuilding. "When we buy a crane we store it in the same area. We have units located all over the country now in storage. Chances are we'll sell them within 100 miles of our purchase place. We engineer the rebuilding ourselves, then sub-let the actual work in the area where a crane is located. This cuts down the cost of rebuilding by eliminating expensive shipping costs."

"In the rebuilding process the equipment is tailored to meet the customer's needs. This often calls for changing the lifting capacity, track length, and span," he says. "In the end, the installation still only runs about half the cost of new cranes, and with a new crane guarantee."



STRIPPED FOR ACTION: In crane rebuilding for Arnold Hughes Co., Detroit, cranes are stripped down to the bare metal. Then they are tailored to customer's needs with latest, improved equipment.

CONSIDER GOOD USED EQUIPMENT FIRST

BENDING ROLLS
10' x 10 Ga. Bertsch No. 6 Initial Type
12 x ⅝" Hilles & Jones Pyramid Type
32' x ¾" BALDWIN PYRAMID TYPE—LATE

BRAKE—LEAF TYPE
12' x ⅛" Dreis & Krump

BRAKES—PRESS TYPE
800 ton Southwark 18' x ¾" Hydraulic
500 ton Pacific 12' Bending Length, Hydraulic

CRANES—OVERHEAD ELECTRIC TRAVELING

8 ton P&H	55' Span 230/3/60
10 ton P&H	39' Span 230 Volt D.C.
10 ton Milwaukee	57' Span 230 Volt D.C.
10 ton Shaw	48' Span 230 Volt D.C.
10 ton Whiting	75' Span 220/3/60 A.C.
10 ton Shaw	120' Span 230 Volt D.C.
15 ton N-B-P	100' Span 220/3/60 A.C.
30 ton Shaw	70' Span 230 Volt D.C.
120 ton Niles	67' Span 230 Volt D.C.

DRAW BENCHES
7,000 lb. Draw Bench, 51 ft. Draw
10,000 lb. Draw Bench, 50 ft. Draw
35,000 lb. Draw Bench, 41 ft. Draw

FORGING MACHINES
1" to 5" Acme, Ajax, National

GEAR REDUCERS
3000 H. P. United (2), Ratio 16.2-1 & 11.6-1

HAMMERS—BOARD DROP—STEAM DROP—STEAM FORGING 800 lb. to 12,000 lb. incl.

LEVELERS—ROLLER
12" Waterbury Farrel 9 Rolls 6" Dia.
24" McKay 17 Rolls 2⅝ Dia.
50" Processor & Leveler, Capacity 50" x .109"
66" Guide 17 Rolls 4½" Dia.
72" Leveler 17 Rolls 2⅝"

MOTOR
800 H.P. Westinghouse 2200/3/60 505 RPM

MULTI SLIDE MACHINE
No. 35 U.S. Multi-Slide, Max. Capy. 4⅛" wide x .089

NIBBLER
Pullmax Model 2, Capacity 11/32"

PRESS—EMBOSSING & COINING
#664 Toledo 600 ton, 2" Stroke

PRESSES—HYDRAULIC
300 ton Southwark, Bed 28" x 28", Stroke 25"
500 ton Watson Stillman Piercing Press, 48" x 72"
500 ton HPM Fastraverse, Bed 36" x 36"
600 ton Birdsboro, Platen 48 x 48", Stroke 15"
1000 ton Southwark, Bed 44" x 54", Stroke 20"
4500 ton B-L-H Bed 68 x 68", Stroke 40"

PRESSES—STRAIGHT SIDE
190 ton Toledo #57½, Bed Area 29x29", Stroke 10"
215 ton Clearing, Bed Area 36x42", Stroke 24"
260 ton Cleveland #7F, Bed 42 x 84", Stroke 12"
500 ton Hamilton #1810¼, Area 19x17½", Stroke 1½"
900 ton Hamilton 4B-1809, Bed 101x181", Stroke 30"

PUMP
250 GPM Aldrich Vertical, Triplex 4¾x9", 1500# Pressure, with 250 H. P. Motor 2300/3/60

PUNCH & SHEAR COMBINATIONS
#1½ Buffalo Universal Ironworker
EF Cleveland, 60" Throat

ROLLING MILLS
3¼" x 7" Six Roll Cluster Mill
10" x 14" Single Stand Two High
10" x 16" Single Stand Two High
12" x 12" Single Stand Two High
12" x 16" Single Stand Two High
16" x 24" Two Stand Two High
20" x 36" Single Stand Two High
26" x 60" Single Stand Two High

ROLLS—FORMING
6 Stand Dahlstrom #450-6 for stock to 4⅛" wide
18 Stand Custom Built, 2½ Shaft, will take 36" wide

SHEAR—GATE
8' x 1" RD Wood Hydraulic

SHEARS—SQUARING
0" x 14 Ga. Edwards, Motor Drive—LATE
10' x 10 Ga. Wysong & Miles
10' x ⅛" Bertsch
12' x 3/16" Cincinnati #1412

SLITTER
24" Torrington Slitting Line, 3½" Arbor

STRAIGHTENERS
Torrington #1734 12-Roll, Capy. 1¾", Rd. 1-9/16"
⅝" Shuster Straightener, 12 Ft. Cut-off

SWAGING MACHINES
#4 Torrington 2-Die, Capy. 2" Tube, ⅝" Solid
#6A Fenn, Capy. 3½" Tube, 1¼" Solid, 10" Die Length, With Hydraulic Feed

TESTING MACHINES
20,000 lb. Baldwin Univ. Hydraulic
60,000 lb. Southwark-Emery Universal Hydraulic
100,000 lb. Olsen Universal Hydraulic
100,000 lb. Olsen Universal Beam Type
500,000 lb. Olsen, Super DeLuxe Compression

THREAD ROLLER
#60 Waterbury Farrel, Max. thread dia. 1"

TUBE REDUCERS
1½" Tube Reducer for steel
2½" Tube Reducer for steel

WIRE DRAWING MACHINES
Type B Morgan 4-Block Capy. #5 Rod down
Scudder 3-Block 20 Dia.
Superior 7-Draft Cone Type, Capy. 14 Ga. down
Vaughn 5 Block, Ea. block M.D. Capy. #5 down

• Manufacturing

A. T. HENRY & COMPANY, INC.

50 CHURCH ST., NEW YORK CITY 8
Telephone COrtlandt 7-3437

Equipment •

Confidential Certified Appraisals
Liquidations — Bona Fide Auction Sales Arranged

Consulting Engineering Service
Surplus Mfg. Equipment Inventories Purchased

FOR SALE

COMPLETE STRIP ROLLING MILL

Late Type, Still Set-Up In Plant

BLISS 4 Stand Tandem, continuous strip mill, rolls 16" diameter x 24" face. Individual 250 h.p. D.C. variable speed motors & controls. Equipped with motor driven recoiler.

NATIONAL MACHINERY EXCHANGE
126 Mott St. New York 13, N. Y.
CAnal 6-2470

FOR SALE

1—8" Diameter x 10" Face 2-Hi Cold Mill
1—3" Rd. Cap. Open End Vertical Bar Shear
1—2¾" Cap. Buffalo Billet Shear
1—12" Dia. x 16" Face 2-Hi Skin Pass Mill
1—5-Roll Abramson Tube Straightener ¾" to 3" O.D. Tube

ALBERT CURRY & COMPANY, INC.
3519-21 BEGELOW BOULEVARD, PITTSBURGH 13, PA.

24" x 28' Hendey Geared Head Lathe, M.D
22'5" Centers
62" King Vert. Boring Mill, R.H. Swivel Head
L.H. Turret Hd., Side Hd., M.D.
5' x 3/16" Beloit Initial Bending Roll M.D
No. ½, No. 1½ Buffalo Univ. Ironworkers, M.D
600 Ton Southwark Hyd. Inclined Wheel Press

FALK MACHINERY COMPANY
16 Ward St., Baker 5-5887, Rochester 5, N. Y.

GUARANTEED—RE-NU-BILT

Electric Power Equipment—A. C. Motors

3 phase—60 cycle

SLIP RING

Qu.	H.P.	Make	Type	Volts	Speed
1	1750	G.E.	M-579BS	4800	1800
1	1500	G.E.	MT	6600	1187
1	800	Whse.	CW	550	1776
1	700	A.C.		2300	500
1	600	Whse.	CW-4-32D-15	440	1778
1	500	G.E.	MT-412	2200	439
1	500	Whse.	CW	550	350
1	200	G.E.	IM	440/2200	580
1	125	G.E.			
		unused	MT-557	220/440	1200
1	100	G.E.	MT-564	440/2200	450
1	250	G.E.	IM-16	220/440	875
1	250	G.E.	MT563Y	220/440	875
1	250	A.C.	Any	550	600
1	250	Whse	CW	2200	450
1	250	Cr.Wh.	Size 29Q	2300	350
1	250	G.E.	MT-424Y	4000	257
1	250	G.E.	IE-13B	220	1800
2	200	Whse.	CW-890	2300	1775
1	200	Whse.	CW-874D	220/440	885
1	200	Cr.Wh.	SR-26QB	440	505
2	200	G.E.	IM-17A	2200	435
3	100	A.C.		440	695

SQUIRREL CAGE

2	100	Whse.	B.B.CS-607	220/440	1780
1	800	G.E.	KT-573	2200	1180
1	500	G.E.	FT-559AY	2200	3600
2	500	Whse.	CS-1115	3300	863/445
4	500	Whse.	CS-1216	2200	500
1	400	Whse.	CS-7151-610H	6600/4000	3585
1	300	Whse.	CS-1002	2300/440	600
2	200	Whse.	CS-8558 D.P.	220/440	1750
1	150	G.E.	FT-558	2200	875
1	150	Whse.	CS	440	580
1	125	Whse.	CS-764C	220/440	1160
3	100	Whse.	CS-760C	2200/440	1100

SYNCHRONOUS

1	6000	G.E.	ATI .8 P.F.	2200/6600	600
1	3500	G.E.	TS 1.0 P.F.	4600/2300/4000	360
1	2500	Whse.	.8P.F.	2300	720
1	2000	G.E.	ATI	2300	900
2	1750	G.E.	ATI	2300	3600
1	1750	G.E.	TS	2300/4600	900
1	735	G.E.	ATI	2200/1200	600
2	700	G.E.	TS .8P.F.	2200	1200
1	350	Whse.	1.0P.F.	440	900
2	350	G.E.	ATI 1.0P.F.	2300	150
1	325	G.E.	ATI 1.0P.F.	440	1800

BELYEA COMPANY, Inc.
47 Howell Street, Jersey City 6, N. J.
Tel. OL 3-3334

---

eastern Rebuilt Machine Tools

THE SIGN OF QUALITY—THE MARK OF DEPENDABILITY

BALL BEARING DRILLS
No. 4 Fosdick, 8" overhang, m.d., H.S.
No. ½ Avey MA8, m.d.
No. 2 Avey, m.d.
No. 1B Edlund, m.d., new
No. 2B-8" H.D. Edlund, H.S., m.d.
No. 2LMS Leland & Gifford H.S., m.d.
No. 2LMS Leland & Gifford, single spindle H.S., m.d.
No. 4BM Fosdick, single spindle, H.S., m.d.
No. 4MS Leland & Gifford H.S., 4 speed A.C. m.d. to spindle
1 spindle No. 2MA6 Avey H.S. Type B, m.d., 7½" overhang, 1943
2 spindle Atlas Bench Type, 1942
2 spindle Allen, belted m.d., 8" overhang
2 spindle No. 2 Avey H.S., belted m.d.
2 spindle No. 2BMA, 1 Avey Production Type, m.d.
2 spindle No. 3 MA6 Avey H.S., m.d.
2 spindle No. 2 Leland & Gifford H.S., 8" overhang, m.d.
2 spindle Leland-Gifford H.S. Hydraulic Type, m.d.
2 spindle No. 2 LMS Leland & Gifford, Hydraulic step by step H.S., m.d.
3 spindle No. 2 Avey, belted m.d.
3 spindle No. 3 Morse Taper, Foote-Burt "Slipp" H.S., m.d.
3 spindle No. 2B-8 Edlund, H.S., m.d.
3 spindle No. 2MA6 Avey, H.S., m.d.
3 spindle Leland-Gifford #1 LMS—H.S., m.d., late
3 spindle Leland-Gifford H.S., m.d.
4 spindle Leland-Gifford, m.d., on each spindle
4 spindle No. 15 Buffalo Bench Type
4 spindle Allen H.S., belt drive
4 spindle No. ½ MA8 Avey, m.d., H.S.
4 spindle Demco H.S., individual m.d.
4 spindle No. 2MS Edlund, m.d.
4 spindle No. 2BMA6 Avey H.S., m.d.
5 spindle Allen H.S., belt drive
6 spindle Leland-Gifford, m.d. on each spindle, No. 2 taper
6 spindle No. 1 Avey High Speed, m.d.
6 spindle No. ½ Avey MA8 Avey, H.S., m.d.

We carry an average stock of 2,000 machines in our 11 acre plant at Cincinnati. Visitors welcome at all times

THE EASTERN MACHINERY COMPANY

1002 Tennessee Avenue, Cincinnati 29, Ohio

MElrose 1241 CABLE ADDRESS—EMCO

ROLLING MILLS—STEEL WORKS EQUIPMENT

1—AUTOMATIC COOLING BED FOR BARS up to 2" dia. consists of run-in table, cascade section, shuffle bar section, runout table, with all electrics, 200 ft. long.
1—21" & 52" x 77" TANDEM COLD REDUCTION MILL, 4-high, 3 stands.
1—18" & 48" x 42" TANDEM COLD REDUCTION MILL, 4-High, 5 stands.
1—28" x 40" HOT STRIP MILL, 2-high, reversing, with 2500 HP D.C. motor generator, etc.
1—25" x 42" x 66" HOT STRIP MILL, 4-high.
1—16" x 22" COLD MILL, 2-high.
1—8 x 10" COLD MILL including uncoiler recoiler and edging rolls.
2—28 3-HIGH ROLL STANDS.
1—New 16" BAR MILL, one 3-high roll stand, pinion stand.
1—New 12" BAR MILL, four 3-high stands, pinion stand.
1—12" MERCHANT BAR MILL with 18" roughing mill and heating furnace.
1—9" BAR MILL, 3-high.
2—MORGAN TRAVELING TILTING TABLES for 24" 3-high bar mill.
1—34" x 192" ROLL GRINDER.
2—65-TON ELECTRIC MELTING FURNACES, TOP CHARGE, with all electrical and mechanical equipment, including 15,000 KVA and 13,333 KVA transformers.
1—New top-charge ELECTRIC MELTING FURNACE with 2000 KVA transformer 13,200 volts, 3 phase, 60 cycle.
1—ELECTRIC MELTING FURNACE, 1-ton, with 1000 KVA tarnsformer.
2—PACK FURNACES for hot sheet mills 62" x 60", double chamber.
1—ROLL LATHE, ENCLOSED HEADSTOCK, up to 36" dia. rolls.
1—OPEN HEARTH CHARGING MACHINE, 5 ton capacity 11' track gauge.
1—SIDE TRIMMER, Streine, maximum width 48", makes 2 cuts 3/16" mild steel.
1—FLYING SHEAR FOR BARS, Morgan, up to 1½ square, moving at speeds up to 1800 FPM.
1—SHUSTER STRAIGHTENING AND CUTTING MACHINE, cap. 1" rd.
1—DORE WIRO-MATIC straightening and cutting-off machine 1/16" to 5/32" dia. 12' long.
1—UNITED HOT SAW, 50" dia. blade sliding frame, 4'8" stroke
1—PROCESSOR AND LEVELER, average gauge .109" 50" wide, 100 to 600 FPM.
1—DRAWBENCH, 30,000 lb., length 29 ft.
1—3000 HP GEAR DRIVE, ratio 500 to 73.7 RPM.
1—3000 HP GEAR DRIVE, ratio 500 to 95.8 RPM.
1—3000 HP GEAR DRIVE, ratio 16.2 to 1.
1—1200 HP GEAR DRIVE, ratio 5.92 to 1.
1—1200 HP GEAR DRIVE, 353 to 94.6 RPM, 3.73 to 1 ratio.
1—3500 HP MOTOR, 11000/6000 volts, 3 phase, 60 cycle, 514 RPM, synchronous, never used.

FRANK B. FOSTER, INC.
2220 Oliver Building, Pittsburgh 22, Pa.
Cable: "Foster, Pittsburgh" Telephone Atlantic 1-2780

RAILS—All Sections
NEW RELAYING—All Accessories
TRACK EQUIPMENT, FROGS—CROSSINGS—TIE PLATES, CONTRACTORS AND MINE & MINING MACHINERY CARS
M. K. FRANK
Grand Central Palace, New York
401 Park Bldg., Pittsburgh, Pa.
105 Lake Street, Reno, Nevada
1209 Metropolitan Bank Bldg., Miami, Fla.

FOR SALE
By
STRUTHERS WELLS CORP.
MACHINE TOOLS

2—5'-13" Col. Cincinnati-Bickford Radial Drills, one of which is Serial No. 5D272. Main Drive motor 7½ HP, 230 volt D.C.

2—6'-17" Col. American Radial Drills, Serial Nos. 51935 and 43529. Main Drive motors 10 HP., 230 volt D.C.

1—Barnes Twin Spindle Model 420 Deep Hole Drilling & Boring Machine—Serial 420-158, 12'-0" stroke, 13½" spindle centers. Main Drive 20 HP., A.C.

1—Ozalid Dry Duplicator Blueprinting Machine, Model SL, Serial 4481, 220 volt AC.

CRANES

1—10 Ton P&H O.E.T. CRANE, cab operated, Serial 10422, lift 14'-11", span 39'-0½", 3 motors, 230 volt DC

1—7½ Ton SHAW O.E.T. CRANE, cab operated, Serial 2416, 3½ ton auxiliary hoist, lift 34'-1", span 40'-0¾", 4 motors, 230 volt DC

1—5 ton SHAW O.E.T. CRANE, cab operated, Serial 1436, Lift 11'-2", span 31'-8½", 3 motors, 230 volt DC

ALL THE ABOVE IN GOOD TO EXCELLENT CONDITION MAY BE INSPECTED UNDER POWER

Write—Wire—Phone

STRUTHERS WELLS CORP.
TITUSVILLE, PENNSYLVANIA

"FASTER FROM FOSTER"
RAIL
& ALL TRACK EQUIPMENT
Nation's Largest Warehouse Stocks

L. B. FOSTER co.
PITTSBURGH 30 • ATLANTA 8 • NEW YORK 7
CHICAGO 4 • HOUSTON 2 • LOS ANGELES 5

FOR SALE
3 OVERHEAD CRANE & RUNWAYS
in perfect operating condition. Formerly Jones Laughlin warehouse in Long Island City, N. Y. The above is for sale. The premises can be leased or sold with cranes. Railroad siding on site. Building can be constructed to suit, 160,000 sq ft or less, incorporating the above. ★ Just completed another building 110,000 sq ft in Maspeth, N.Y.C., ready for immediate occupancy. ★ Additional 200,000 sq ft of land available in Maspeth. ★ All of the above locations are in the immediate vicinity of the Long Island Expressway, 15 minutes from major airports and 7 minutes from mid-Manhattan.
For brochure & info, contact principals
H. B. MACK or S. HEIFERMAN
58-58 Grand Ave., Maspeth, Queens, N.Y.C.
Phone DAvenport 6-2800

OVER 1,000 NEW AND USED MACHINE TOOLS IN STOCK
WRITE FOR LATEST STOCK LIST
MILES MACHINERY COMPANY
2041 EAST GENESEE • SAGINAW, MICH. PL 7-3105

"FOR SALE"
"BARGAIN"
"PAINT EQUIPMENT"

1—Ashdee Automatic Electrostatic Paint System complete with three (3) Fostoria Series 48-000 Floor Mounted Portable Radiant Ovens with Gold Plated Reflectors. All equipment in first rate condition. Available for immediate shipment. Make reasonable offer.

WRITE WIRE PHONE
THE J. B. BEAIRD COMPANY, INC.
PURCHASING DEPARTMENT
6200 ST. VINCENT AVENUE P. O. BOX 1115
SHREVEPORT, LOUISIANA PHONE: 7-4441

ROLL GRINDERS
36" x 240" CINCINNATI
60" x 192" CINCINNATI
Traveling Wheel Head
Filmatic Bearing—Hydraulic Feed
Crowning Attachment—Motors—Controls
IN STOCK
LANG MACHINERY COMPANY, INC.
28th St. & A.V.R.R. PITTSBURGH 22, PA.
GRant 1-3594

OFFERING
BRIDGE CRANES
ARNOLD HUGHES COMPANY
2765 Penobscot Bldg. Detroit, Mich.
WOodward 1-1894

OVERHEAD CRANE

DRAVO ELECTRIC
TRAVELING GANTRY
7 TON LIFT
CAB CONTROLS
180' SPAN
90' EXTENSION
EASILY DISMANTLED

GREENPOINT COAL DOCKS
171 West St., Brooklyn 22, N. Y.
Evergreen 9-5100

BEST BUY OF THE WEEK!

Blaw Knox (St. Paul) Hyd. Billet Chipper—Cap. 13" sq. x 20' — New 1951

STROM MACHINERY CORP.
1828 Summer St., Hammond, Ind.

Goss and DeLeeuw five spindle 8"

Work Rotating Chucking Machine, fine condition. Used less than three months.

J. E. BULLOCK CO.
19449 Jas. Couzens Hwy., Detroit 35, Mich.
Broadway 3-1211

WORLD'S LARGEST STOCK
STAMPING PRESSES
SQUARING SHEARS • PRESS BRAKES
REBUILT and GUARANTEED

WILL LEASE WITH OPTION TO PURCHASE, OR WILL FINANCE OVER LONG TERM

JOSEPH HYMAN & SONS
TIOGA, LIVINGSTON & ALMOND STS.
Philadelphia 34, Pa. Phone GArfield 3-8700

Locomotives & Locomotive Cranes

1—25 Ton Diesel Electric Locomotive
1—45 Ton G. E. Diesel Electric Locomotive
1—25 Ton Ohio Diesel Locomotive Crane
1—30 Ton Browning Diesel Locomotive Crane
1—25 Ton Bay City 190T61 Truck Crane

B. M. WEISS COMPANY
Girard Trust Bldg. Philadelphia 2, Pa.

FORGING CAPACITY AVAILABLE

Available for short or long runs, two 5" Ajax Upset Forging Machines; also, one 6" Langelier Swaging Machine, together with Tocco Induction Heating Equipment. Can handle up to 5" solid round and 6" O.D. pipe or tubing. Inquiries welcome.

The Murray Tube Works, Inc.
P. O. Box 476, Elizabeth, N. J.

EQUIPMENT AND MATERIALS WANTED

STAMPING Plant Wanted

Heavy tonnage—large bed presses. Send full particulars.

ADDRESS BOX G-850
Care *The Iron Age*, Chestnut & 56th Sts., Phila. 39

WANTED
Overhead crane runway,
520 ft. long, 33 ft. high, 88 ft. 4 in. gage, 15 ton capacity, 80 lb. Canadian rail, "A" Frame Structure, 40 ft. girder span.

Write to E. E. Wilmoth
c/o New York Shipbuilding Corp.
P. O. Box 620, Camden, N. J.

WANTED
SURPLUS STEEL
WALLACK BROTHERS
7480 S. Damen Ave. Chicago 36, Illinois

WEISS STEEL CO. INC.
600 WEST JACKSON BLVD.
CHICAGO 6, ILLINOIS
Buyers of Surplus Steel Inventories
39 Years of Steel Service

SURPLUS STEEL
NEW *WANTED* USED
Structurals, Plate, Pipe and Tubing
Consumers Steel & Supply Co.
P. O. Box 270, RACINE, WISCONSIN

WANTED
BRIDGE CRANES
ARNOLD HUGHES COMPANY
2765 PENOBSCOT BLDG. DETROIT, MICH.
WOodward 1-1894

EMPLOYMENT EXCHANGE

EMPLOYMENT SERVICE

HIGH GRADE MEN—Salaries $5,000 to $25,000. Since 1915 thousands of Manufacturing Executives, Engineers, Sales Managers, Comptrollers, Accounts, and other men of equal calibre have used successfully our confidential service in presenting their qualifications to employers. We handle all negotiations. Submit record with inquiry. The National Business Bourse, 20 W. Jackson Blvd., Chicago.

SITUATION WANTED

SALES REPRESENTATIVE, STEEL TUBING, 20 years sales experience in low carbon welded steel tubing, mechanical and pressure; familiar with structural and stainless tubing Address Box G-859, Care *The Iron Age* Chestnut & 56th Sts., Philadelphia 39, Pa.

FORGE AND DIE MAN—21 years' experience from Helper to Supervision. Age 43. Available in 30 days. For complete resume Address Box G-862, Care *The Iron Age*, Chestnut & 56th Sts., Philadelphia 39.

HELP WANTED

SUPERINTENDENT

to take direct charge of all production equipment in cold roll strip steel mill. Excellent salary. References should include all possible previous job superiors.

Apply to: H. B. Hinman, Jr.
Rome Strip Steel Co., Inc.
530 Henry St., Rome, N. Y.

METALLURGICAL ENGINEER
FERROALLOY EXPERIENCE

Experienced ferroalloy metallurgist required for new operation in Mexico. Job will consist of training crews in furnace operation and handling all phases of metallurgy. A thorough knowledge of manganese metallurgy imperative. Send complete resume in duplicate.

ADDRESS BOX G-848
Care *The Iron Age*, Chestnut & 56th Sts., Phila. 39

METALLURGICAL ENGINEER

Experience required in the manufacture and application of carbon and alloy steel plate —Philadelphia area location.

ADDRESS BOX G-861
Care *The Iron Age*, Chestnut & 56th Sts., Phila. 39

STEEL PLANT STAFF ENGINEERS

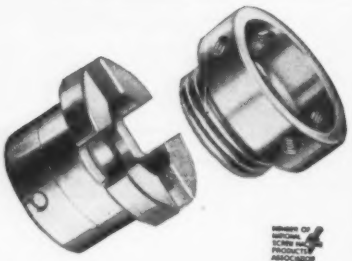
Graduate Mechanical, Civil and Electrical Engineers are needed for permanent positions in our Plant Engineering Department at Fontana.

Opportunities are available for Engineers whose experience includes maintenance and layout of rolling mills and steel making facilities.

Send complete resume including salary requirements to

Employment Manager
KAISER STEEL
CORP.
P.O. BOX 217
FONTANA, CALIF.

OLSON
SCREW MACHINE PRODUCTS



Made to your specifications and tolerances. From smallest up to 2⅝" diameter in steel, brass and aluminum.

OLSON MANUFACTURING CO.
101 Prescott St., Worcester, Mass.

Serving you since '82
CONTRACT STAMPING
ASSEMBLIES
SUB-ASSEMBLIES
FINISHING
From print or sample
★
DESIGN AND DEVELOPMENT
★
TOOL AND DIE MAKING
★
HUEBEL MFG. CO., INC.
Kenilworth 3, New Jersey

THE FORMULA:
Multi-operation presses
plus
Yankee skilled workmen
over
Eighty years manufacturing
know-how equals
Low cost metal stampings
And precision assemblies
To meet your needs
The GREIST MANUFACTURING CO.
646 Blake St., New Haven 15, Conn.

K
SINCE 1895
DROP FORGINGS
Small drop forgings up to one pound in size. Inquiries invited for very prompt action.
KEYSTONE FORGING COMPANY
Northumberland Pennsylvania GReenwood 3-3525

PIT-MOLDED CASTINGS
. . . a specialty in our MEEHANITE foundry. We can handle any size casting from 5 to 26,000 pounds, rough or machined to your specifications. (MEEHANITE properties lie between cast iron and steel.)
Our shops are also equipped for:
- LARGE PATTERN MAKING
- HEAVY PLATE STEEL FABRICATION
- MACHINE SHOP FACILITIES
- PRODUCTION AND ASSEMBLY OF CUSTOM-BUILT MACHINERY

HARDINGE MANUFACTURING CO.
240 Arch Street York, Pennsylvania
Phone 33821

Nepsco
NEW ENGLAND PRESSED STEEL COMPANY
Contract Manufacturer since 1914
METAL STAMPINGS
SPECIALTIES — APPLIANCES
For Industrial and Domestic Users
P. O. BOX 29
NATICK MASSACHUSETTS

MEEHANITE® METAL CASTINGS
ROUGH OR MACHINED
ONE TO 60,000 POUNDS
FOR
STRENGTH — ABRASION
CORROSION OR HEAT
ROSEDALE FOUNDRY & MACHINE CO.
1735 PREBLE AVE., PITTSBURGH 33, PA.

DROP FORGINGS
Special Forgings—High Quality, Fast Delivery
For prompt attention phone or send prints to John Bello.
CARCO INDUSTRIES, INC.
7341 Tulip Street, Phila. 35, Pa.
DEvonshire 2-1200

Special Washers
We carry in stock Silicon killed steel specially suited for case-hardening. Stock dies for producing washers from .0015 to ½" thick.
Thomas Smith Company
294 Grove St., Worcester, Mass.

DROP FORGINGS
To Your Specifications
Prompt Quotations
BALDT ANCHOR CHAIN & FORGE DIVISION
P. O. Box 350—Chester, Pennsylvania

SPECIAL MACHINERY
DIAMITE *Abrasive Resistant* Castings
NI-RESIST *Heat & Corrosion Resistant* Castings
P M G BRONZE *High Strength Acid Resistant* Castings
Fully Equipped—Pattern Foundry & Machine Shop Facilities—Castings to 15 tons
Weatherly Foundry & Mfg. Co., Weatherly, Pa.

DROP FORGINGS
Special Forgings of Every Description.
We solicit your prints or model for quotation.
Wilcox Forging Corporation
Mechanicsburg Penna.

An asterisk beside the name of advertiser indicates that a booklet, or other information, is offered in the advertisement.

A

Acme Steel Co. 141
*Acme Welding, Division of The United Tool & Die Co. 132
*Aldrich Pump Co. 13
Alemite Div., Stewart-Warner Corp. 110
*Allen-Bradley Co. .....143 & 144
Aluminium Limited Sales Inc. .. 153
American Brass Co., The 109
American Messer Corporation 24 & 25
*American Welding & Mfg. Co., The 136
*Apex Machine & Tool Co. 135

B

*Babcock & Wilcox Co., The Tubular Products Div. 4
Baker, J. E., Co., The 64
Baldt Anchor, Chain & Forge Div. 174
Baldwin-Lima-Hamilton Corp. Loewy-Hydropress Div. 41
Baldwin-Lima-Hamilton Corp. Standard Steel Works Div. 56
Beaird, J. B., Company, Inc. 172
Bearings, Inc. 98
Belyea Co., Inc. 171
Bethlehem Steel Co. .....1 & 176
Birdsboro Steel Foundry & Machine Co. 150
Bonded Crating & Packing Corp. 172
Bower Roller Bearing Division—Federal-Mogul-Bower Bearings, Inc. 61
*Bridgeport Brass Co. 88
Bullard Co., The 92
Bullock, J. E., Co. 173

C

Carco Industries, Inc. 174
Carpenter Steel Co., The .....48 & 49
Chase Brass & Copper Co. 66
*Cincinnati Milling Machine Co., The, Cincinnati Milling Products Division 38
*Cincinnati Milling Machine Co., The, Grinding Machine Division 96
*Cincinnati Shaper Co., The 34 & 35
*Cleveland Worm & Gear Co. .. 76
*Coffing Hoist, Division of Duff-Norton Company 57
Colorado Fuel & Iron Corp., The .....32 & 33
Columbia-Geneva Steel Div., United States Steel Corp. ..36 & 37
Consumers Steel & Supply Company 173
Copperweld Steel Co., Ohio Seamless Tube Division 12
Crucible Steel Co. of America.. 69
Curry, Albert, & Co., Inc. 171

D

*Dempster Brothers, Inc. 149
*Devcon Corporation 106
*Diamond Manufacturing Co. 11
*DoAll Co., The 145
Dravo Corporation 108
*Duff-Norton Company Coffing Hoist Division 57
Dynapak Convair, Division of General Dynamics Corporation 95

E

Eastern Machinery Co., The 171
Ex-Cell-O Corporation Inside Front Cover

F

*Fabricated Products Co. 147
Falk Machinery Co. 171
Fate-Root-Heath Co. 39
*Flynn, Michael, Mfg. Co., Aluminum Div. .....30 & 31
*Foote Bros., Gear & Machine Corp. 63
*Foote Mineral Co. 104
Foster, Frank B., Inc. 172
Foster, L. B., Company 172
Frank, M. K. 172
Frasse, Peter A., & Co., Inc. ... 54

G

*Garlock Packing Co., The 19
*Gleason Works 10
*Goodrich, B. F., Industrial Products Company 5
Goss & DeLeeuw Machine Co. .. 168
Greist Manufacturing Co., The.. 174

H

Harbison-Walker Refractories Co. 20 & 21
Hardinge Mfg. Co. 174
*Hendrick Manufacturing Co. .. 134
Henry, A. T., & Co., Inc..... 171
Huebel Mfg. Co., Inc. 174
Hughes, Arnold Co. .....172 & 173
Hyman, Joseph, & Sons 173

I

*Inductotherm Corporation 14
*Ingersoll Kalamazoo Division, Borg-Warner Corp. 157
Ingersoll-Rand Co. 148
Inland Steel Co. 8
*International Business Machines.. 87
Iron & Steel Products, Inc. 170

J

Johnson Steel & Wire Company, Inc. .....42 & 43
*Jones & Lamson Machine Co. .. 68
Jones & Laughlin Steel Corp., Stainless & Strip Division..... 90

K

*Kaiser Aluminum & Chemical Sales Inc., Kaiser Chemicals Division .....72 & 73
Kaiser Steel Corp. 173
*Kardong Brothers, Inc. 168
Keystone Forging Company 174

L

Lamina Dies & Tools, Inc. 50
Lang Machinery Co., Inc. 172
Loewy-Hydropress Division, Baldwin-Lima-Hamilton Corp... 41
Luria Bros., & Co., Inc. 159

M

MacCabe, T. B., Co. 170
Mackintosh-Hemphill, Division of E. W. Bliss Co. 51
Miles Machinery Co. 172
*Monarch Machine Tool Co..... 45
Murray Tube Works, Inc. 173

N

NRC Equipment Corporation 28
National Business Bourse, Inc. .. 173
National Machinery Exchange .. 171
*National-Standard Co. .....26 & 27
National Steel Corp. 114
National Tube Div., United States Steel Corp. .....36 & 37
New England Pressed Steel Co. .. 174
New York Shipbuilding Corp. .. 173
Norton Company, Abrasive Grinding Wheel Division 103

O

*Oakite Products, Inc. 133
Ohio Seamless Tube, Div. of Copperweld Steel Co. 12
Oliver Corp., The, A. B., Farquhar Division 111
Olson Manufacturing Co. 174

P

Pangborn Corp. ..Inside Back Cover
*Penn Metal Co., Inc. 55
*Pennsalt Chemicals Corporation 40
Pittsburgh Steel Co. .....42 & 43
Platt Bros., & Co., The 168
Plymouth Locomotive Works, Div. of The Fate-Root-Heath Co. .. 39
Porter, H. K., Company, Inc. ... 139

R

*Republic Steel Corp. .....58 & 59
*Revere Copper & Brass, Inc. .. 100
Riverside-Alloy Metal Division, H. K. Porter Company, Inc.... 139
Roebling's, John A., Sons Corp. 62
Rome Strip Steel Co., Inc. 173
Rosedale Foundry & Machine Co. 174
Ryerson, Jos. T., & Son, Inc. ... 6

S

*Sandvik Steel, Inc. 29
*Sherritt Gordon Mines Ltd. ... 104
*Sier-Bath Gear & Pump Company Inc. 131
*Silent Hoist & Crane Co. 15
*Simonds Abrasive Co. 71
*Smith, A. O., Corporation ..22 & 23
Smith, Thomas, Co. 174
*Springfield Machine Tool Company 70
Standard Steel Works Div., The Baldwin-Lima-Hamilton Corp. .. 56
Strom Machinery Corp. 173
Struthers Wells Corporation, Titusville Forge Division 172
Stulman-Emrick Lumber Co., Inc. 172

T

*Textile Machine Works 53
Timken Roller Bearing Co., The .....Back Cover
Tinnerman Products, Inc. 107
*Towmotor Corporation 47
Townsend Company, The 16
Tubular Rivet & Stud Company 112 & 113

U

*Uddeholm Company of America, Inc. 52
*Udylite Corp., The 46
Union Carbide Metals Co., Division of Union Carbide Corporation 74
United States Steel Corp. ..36 & 37
United States Steel Export Co. 36 & 37
*United States World Trade Fair 65

W

Wallock Bros. 173
Washington Steel Corporation .. 142
Waterbury-Farrel Foundry & Machine Co. Div. of Textron Inc. 60
Weatherly Foundry & Mfg. Co. .. 174
Weirton Steel Co. 114
Weiss, B. M., Co. 173
Weiss Steel Co., Inc. 173
*Wender Presses, Inc. 44
Westinghouse Electric Corp. 17 & 18
Wilcox Forging Corp. 174

Y

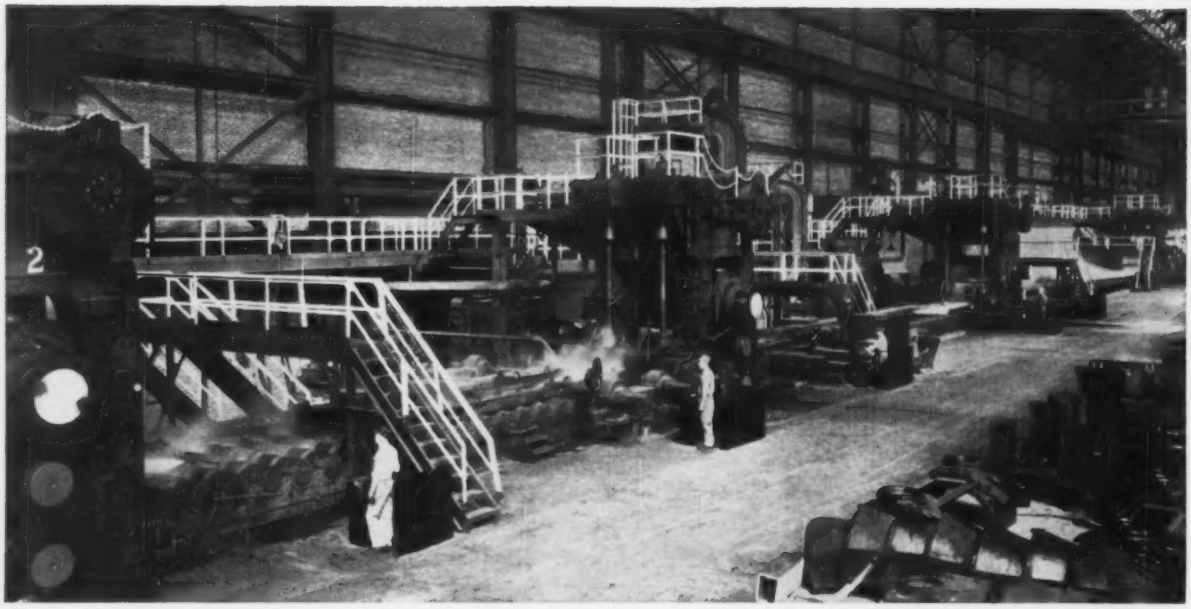
*Yale & Towne Manufacturing Co., The, Materials Handling Div. 67

Z

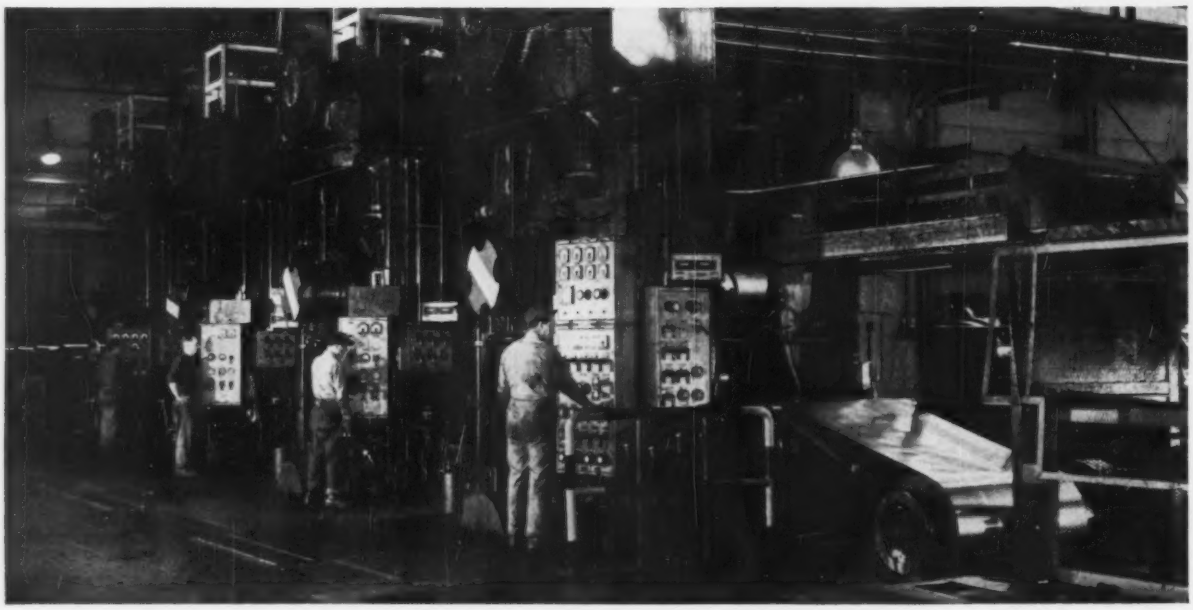
Zak Machine Works, Inc. 168

CLASSIFIED SECTION

Clearing House 170-173
Contract Manufacturing 174
Employment Exchange 173
Equipment & Materials Wanted 173



On these giant sheet mills we measure in 000ths



Shown at the top is the 68-in. continuous hot mill at our Sparrows Point, Md., plant. Entering this mill as slabs several inches thick, hot steel whizzes through at ever-increasing speeds until it emerges as hot-rolled sheet at speeds up to 2120 ft per min. The finest hot-rolled sheet steel you can buy!

Some of this hot-rolled steel is further reduced cold at still higher speeds for use in automobile body stampings and a host of other applications. Typical of Bethlehem's up-to-the-minute facilities is the 54-inch cold mill at our Lackawanna, N. Y., plant (lower photo).

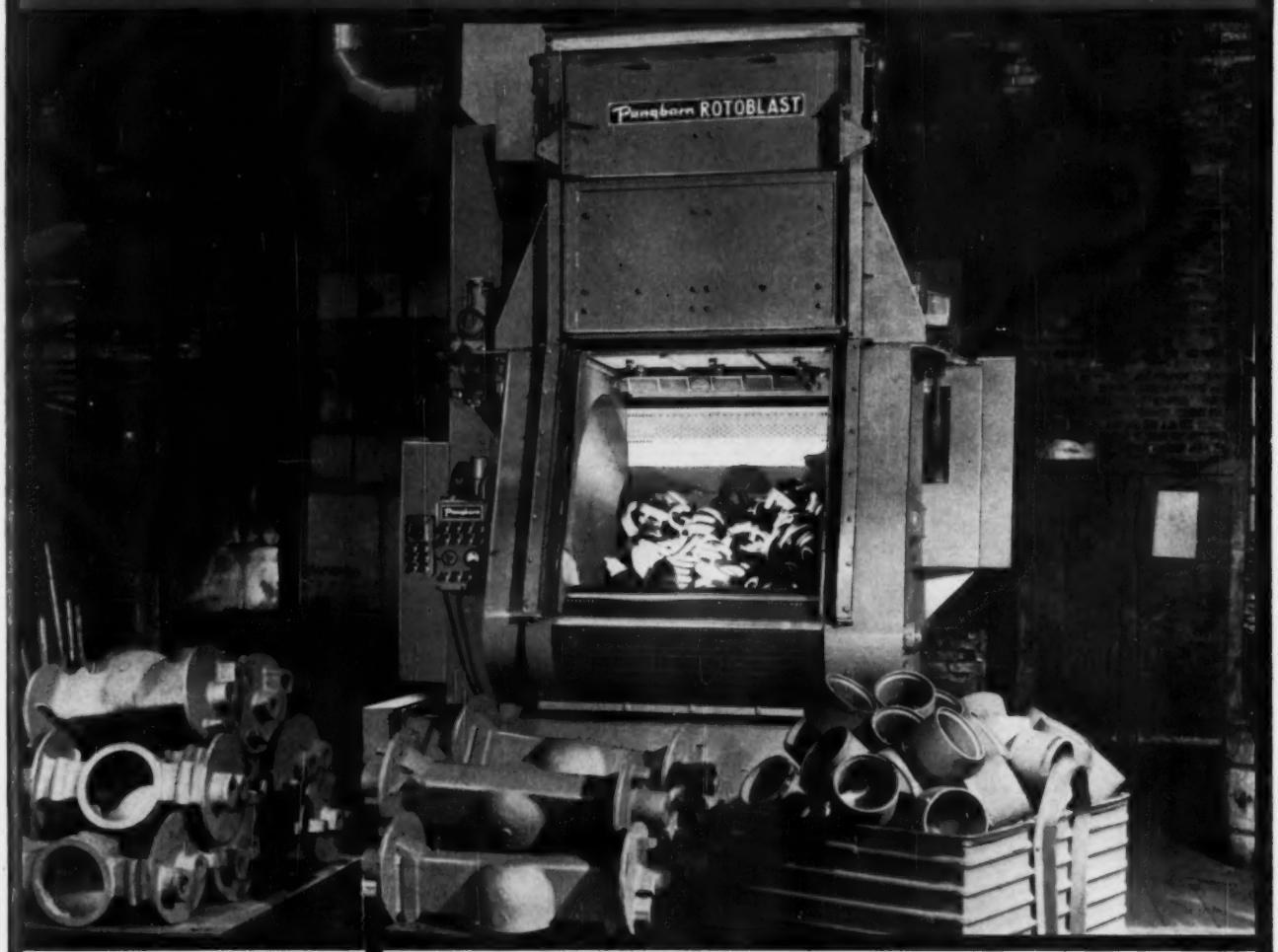
Massive though these mills are, experienced operators control thickness tolerances within a very few thousandths of an inch! And all along the line, Bethlehem sheets are carefully checked to insure uniformity of gage, surface, weight and mechanical properties.

BETHLEHEM STEEL COMPANY, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

CUTS MAN-HOURS 38%

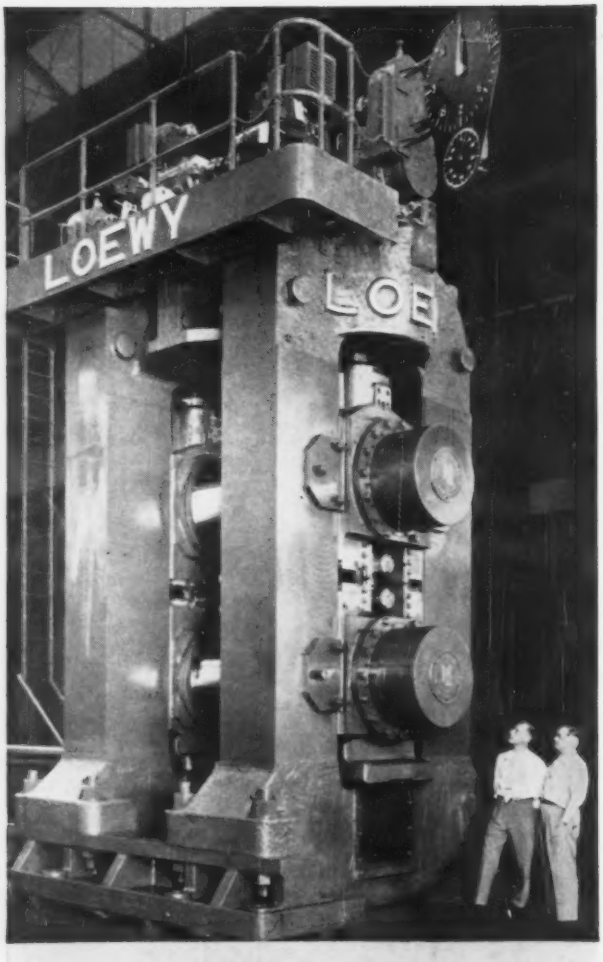


Pangborn Rotoblast cuts man-hours per day from 24 to 15 at Meadville Malleable Iron

The investment in a new 20 cu. ft. Pangborn Rotoblast Barrel has really paid off for Meadville Malleable Iron Co., Meadville, Pa.! By switching from a competitive barrel of about 12 cu. ft. capacity, the firm now cleans loads three times as large in half the time. Today tote box loads averaging 1900 lbs. each are cleaned in 4-5 minute cleaning cycles. As a result, the Rotoblast Barrel has cut 24 man-hours per day to 15 man-hours in the cleaning department and greatly improved the quality of the work.

How much time and money can Pangborn Rotoblast save you? It would pay you to talk to the Pangborn man in your area. Or write PANGBORN CORP., 1500 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Blast Cleaning and Dust Control Equipment and Rotoblast Steel Shot and Grit.*

Pangborn CLEANS IT FAST WITH **ROTOBLAST®**



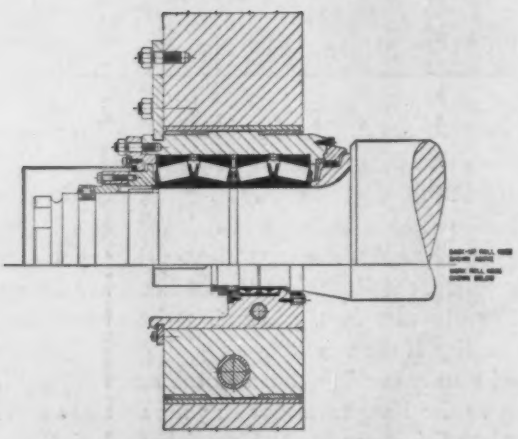
Rolls up to 20″ x 20″ the "hard" way... Timken® bearings take the shock

THIS powerful 4 Hi reversing mill, built by Loewy-Hydropress Division of Baldwin-Lima-Hamilton Corp., is doing its job the "hard" way—rolling small slab ingots of special hard alloys up to 20″ x 20″. To roll them down to .010″ or less takes a lot of force. It's hard work. This mill operates at a separating force of 140,000 lb. per inch of width—at speeds from 75 to 200 fpm. To take the heavy shocks, keep bearing cost down, Timken® tapered roller bearings are used to mount the back-up and work rolls, screwdown drive and screwdown worm gear. 24 Timken bearings all told.

Here are the big reasons why 1008 steel mills use Timken tapered roller bearings on roll necks:

1. Longer life. Tonnage records show that the long life of Timken roll neck bearings keeps bearing cost per ton of steel rolled at rock bottom. **2. Better mill rigidity.** Balanced proportion design of Timken bearings permits larger roll necks than ever before possible with tapered roller bearings. Load ratings are increased up to 40% due to Timken bearings' balanced proportion design. **3. Simplified lubrication.** No complicated systems; Timken bearings permit use of simple grease lubrication. **4. No special thrust bearings needed.** Timken bearings take *both* radial and thrust loads. **5. Steel loss ended in mill stops and starts.** Timken bearings permit starting under full loads. **6. Faster mill rolling speeds** because Timken bearings minimize friction.

Timken bearings make any machine better. And better machines make better products. That's Better-ness. And the trade-mark "TIMKEN" is your symbol of Better-ness. Look for it. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".



How **LOEWY-HYDROPRESS** mounts rolls of this 12 x 43 x 42 mill on Timken bearings to take shocks, assure longest, most economical life.

This symbol on a product means its bearings are the best.

BETTER-ness rolls on **TIMKEN®** tapered roller bearings